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ABSTRACT

A study involving 45 physically handicapped brain injured children (including Ss diagnosed with cerebral palsy, spina bifida, and other types of brain injury) and 10 physically handicapped non-brain injured children ranging in age from 2-8 years was conducted to determine if there is something distinctive about a brain injured child which suggests differences in teaching behavior in a preschool setting. The procedure included four steps: student evaluation on such tasks as the Stanford Binet Intelligence Test, a five-hole form box, and Montessori cylinders; five initial observations of pupil-teacher interaction; individual tutorial sessions; and five follow-up observations. The major components (competence, temperament, and style of non work) which emerged were not situation specific, but were found to be related to teacher and child behaviors in both the individual tutorial session and the classroom. Distinctive patterns of response to cognitive demands, which were independent of competence, were found for the cerebral palsy, spina bifida, and non-brain injured groups. Findings indicated that a child's competence, cognitive style, and response style are dimensions of behavior which influence teaching style; and that there is a need to broaden the concept of brain injury in children because injury is not a unitary concept. (Provided are appendixes which include demographic characteristics of Ss, directions for numbering responses and recording, and a summary of classroom observations.) (Author/SB)

Final Report

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Response Patterns in Brain Damaged Children
and Teaching Styles

Leonard Diller, Ph.D.
Project Director

Wayne A. Gordon, Ph.D.
Associate Director

Helen Hanesian, Ed.D.
Chief Investigator

Marilyn Hutchinson, M.A.
Dee Ann Kind, M.A.
Ora Ezrachi, B.A.
Project Assistants

Louis J. Gerstman, Ph.D.
Ronnie Gordon, M.A.
Project Consultants

Institute of Rehabilitation Medicine
New York University Medical Center
400 East 34th Street
New York, New York 10016

July, 1973

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SUMMARY

This investigation was concerned with the following issues:
1) Cognitive functioning in young children - unidimensional or multi-dimensional? 2) Cognitive functioning in the psychological evaluation and classroom settings. 3) Differences in cognitive functioning and different diagnoses. 4) What are the parameters of teaching behavior in the classroom? 5) Are parameters of a child's cognitive functioning related to parameters of teaching behavior?

This study examined a child's competence and response style in an evaluation situation and in a naturalistic preschool setting. It also examined a teacher's style of instructing the child and the relationship between a teacher's style of response and a child's response style.

The purpose was to answer the following questions:

1. Is what is taught related to characteristics of children?
2. Are there aspects of the classroom which are rearranged to take these characteristics into account?

The subjects were 55 physically handicapped brain injured and non-brain injured children ranging in age from 2-6 to 6-8 years. The brain injured experimentals (N=45) were medically diagnosed as cerebral palsy or spina bifida, while the non-brain injured controls (N=10) were congenital amputee, rheumatoid arthritis and myopathy. They came from low and middle socioeconomic levels.

The procedure included: A) Evaluation, B) Five Initial Observations of Pupil-Teacher Interaction, C) Individual Tutorial Session, D) Five Follow-Up Observations.

A. Evaluation. The evaluation, given the first week the child was in preschool, included the Stanford Binet Intelligence Test and two educational toys, a five-hole form box and Montessori cylinders. Scoring on the Stanford Binet was done in terms of competence and style such as pass vs fail, work vs non work and verbal vs non verbal. Competence and style were measured on the toys by number of trials, assists and type of error such as rotation, form, spoils, etc.

B. Classroom Observation. During the second week of the child's preschool program, the pupil-teacher interaction was observed in the naturalistic setting of the classroom from a one-way vision room. The observer recorded five 10 minute samples of behavior on five consecutive days, reporting into a dictaphone all significant behavior emitted by the child as well as all behavior directed toward the child. Ecological information about pupil-teacher ratio and task was noted. Structured materials such as puzzles or form box were Type I tasks, while unstructured materials, such as painting or water activity were Type II. These behavior protocols were classified at five levels.

- Level I Number of responses for teacher, child and others interacting with the child.
- Level II Child Responses - Independent, Non Independent
- Level III Child Response Style - Work, Non Work, Verbal, Non Verbal and Social
- Level IV Teacher Intervention Styles - Preparational, Instructional, Controlling, Social and Miscellaneous. These were further divided into verbal and non verbal.
- Level V Instructional Intervention Subcategories - information giving, showing, assisting, elicit a response, presents, redirects, reinforcement and roleplaying.

The procedure for C) Individual Tutorial Session and D) Follow-Up Session was similar to the classroom observation. In the individual tutorial session, the teacher was limited to six educational materials.

The results of this study indicated that performance in a psychological evaluation was complex and multidimensional. The major components which emerged were competence, temperament and style of non work. These factors were not situation specific, but rather were found to be related to teacher and child behaviors in both the individual tutorial session and the classroom. Distinctive patterns of response to cognitive demands, which were independent of competence, were found for the cerebral palsy, spina bifida and non-brain injured groups. The findings of this study indicated that a child's competence, cognitive style and response style were dimensions of behavior which influenced teaching style.

These results imply a need to broaden the concept of brain injury in children, because injury is not a unitary concept. The findings further suggest the added educational relevance of mental age. It is related to cognitive style in the evaluation and predicts a child's classroom response style and teaching style. Mental age also appears to be a more meaningful descriptor than chronologic age for this group of handicapped brain injured children.

INTRODUCTION

Is there something distinctive about a brain injured child which suggests differences in teaching behavior in the classroom? Embedded in the question are the seeds of many issues germane to education and habilitation including that of medical vs. educational diagnosis, the relevance of methods of assessment to intervention, the strategies of teaching behavior, and delimitation of characteristics of brain injured children pertinent for classroom behavior, to name only a few. Clearly the question, if at all answerable, is subject to many constraints which help in both delimiting and defining it. In this study the question has been explored by examining a number of issues which will be briefly reviewed: 1) Cognitive functioning in young children - unidimensional or multidimensional? 2) Cognitive functioning in the psychological evaluation and other situations. 3) Differences in cognitive functioning and different diagnoses. 4) What are the parameters of teaching behavior in the classroom? 5) Are parameters of a child's cognitive functioning related to parameters of teaching behavior?

1. Cognitive Functioning in Preschool Children

Cognitive functioning in preschool children has been examined in three ways: (a) as the capacity to solve problems of increasing difficulty with increasing age, (b) as change in cognitive style, and (c) as manifestation of response style. The following will be considered briefly: a) Mental age may be considered the best expression of a child's increasing ability to solve problems as he gets older. By definition it correlates perfectly with chronologic age. While generally expressed as an outcome of standard psychological tests, there is no reason why it cannot be expressed in terms of performance on educational materials commonly used by teachers for both assessment and instruction. This raises a subquestion: Is competence on the Stanford Binet associated with competence on a form box task and the Montessori cylinders? The latter tasks, commonly used in nursery school settings might be thought to be particularly vulnerable to failure in brain injured populations (Gordon, White & Diller, 1972). Although they do not require verbal responses, there are clearly a number of steps involved in their solution. Work in this setting (Gordon, White & Diller, 1972) suggested that the latter tasks distinguish brain injured (cerebral palsied and spina bifida) children from non handicapped middle and lower class children. Furthermore, both tasks were sensitive to differences in cognitive style between the groups. b) Cognitive style refers to those relevant dimensions of stimuli which appear to become salient at different ages. White (1965) has summarized the work of 21 contemporary investigators ranging from Bayley to Zigler whose research indicated that different processes are involved in problem solving at different age levels. On educational toys it was found that in a form box problem a triangle was more difficult to place than a square, particularly if it was rotated (Gordon, White, & Diller, 1972;

Ghent, 1960). One might expect that older children are more reflective and therefore formulate hypotheses before they act in contrast to younger children who seem to act without a plan (Meyer, 1940). The non-brain injured child appeared to operate in a more systematic way suggesting he is responding on the basis of a hypothesis when compared with the brain injured child (Gordon, White & Diller, 1972). c) Response style refers to the maintenance of the same behaviors or behavior patterns even when stimuli are altered. These behavior patterns are not tied to specific task demands, but operate in a wide variety of situations. Hertz'ig et al. (1968) have noted that Puerto Rican children appeared to be less task oriented than matched controls even at the age of 3. Task relevant behavior or ~~was~~ would seem to be a type of behavior which would increase with age and may or may not be independent of competence. The same may be said for verbal versus non-verbal behavior. Verbal behavior should increase with age and may or may not be reflected by mental age.

Examination of the interrelationships of competence, cognitive style and response style as different reflections of mental life would then seem to be a useful step in helping to define pertinent parameters of a child's behavior. The use of educational toys as meaningful markers would be a way for nursery school teachers to understand and translate this step into practice.

If cognition is multidimensional, which dimensions distinguish brain injured children and to which dimensions does the teacher respond?

2. Cognitive Functioning in Different Situations

Psychological examinations, although the most popular method of assessing cognitive functioning, present tasks under only one set of conditions. The limitations of these circumstances and the ways in which they may influence results have received much attention from workers interested in children who deviate from normative population groups used in standardizing a test. Cazden's (1972) studies of language of black children under free and test conditions pointed to this fact. Cole and Bruner's (1971) comments on the assessment of these children were reminiscent of the comments of Bortner and Birch (1969) who distinguished between ability and performance in neurologically impaired children. Test scores are direct measures of performance, but only indirect measures of ability. The brain injured child who fails a task in the face of one set of stimulus conditions may pass under another (Bortner and Birch, 1969). There are three types of situations under which assessment is commonly conducted: (a) The psychological evaluation which aims to assess weakness and strength on a variety of tasks ranging from very easy to very difficult. Indeed, the very nature of the examination in addition to its fixed instructions requires the child to fail some items. (b) The educational work sample which probes strength and weakness not by making some tasks too difficult and adhering to fixed procedures of administration but by altering task demands to see what kinds of cues are most helpful to stimulate success. This tutorial session takes place in a context of support for a student. (c) The classroom which alters the one-to-one relationship and creates a different atmosphere by virtue of

its setting and purpose. The question is posed here - Is the child's cognitive functioning consistent across different situations? If it is, then it keeps alive the underlying hypothesis of a lawful relationship between cognitive functioning and teacher behavior. If it is not then there are: a) no lawful relationships between the child's behavior and the teacher's or b) lawfulness exists but it is not mediated by cognitive functioning.

3. Differences in Cognitive Functioning and Medical Diagnoses

Since there are many subtle issues involved, the interplay between medical and behavioral diagnoses and management has attracted scrutiny on several levels. For example, the development of custodial institutions, educational systems and rehabilitation settings historically has been based on medical diagnostic categories. This fact has frequently led to the neglect of important needs of the subjects for whom these programs were ostensibly established to serve (Goffman, 1961). Etiology and treatment often make an imperfect fit. This question of medical vs. behavioral diagnoses has implications for this study. The question emerges, does a teacher do anything different as a consequence of a child being brain injured? The question is complex for the concept of brain injury covers marked neurologic heterogeneity as well as taking in considerable variations in patterns of behavior. Confusion over the concept of brain injury exists in a number of areas. For example, the entity "the minimally brain injured child," i.e., the child identified as brain damaged without hard neurologic signs, has been the subject of much controversy. There are many investigators who argue that the test patterns which are indicative of soft neurological signs are artifacts of failure to control for competence (Birch, 1964). Recent studies (Belmont & Birch, 1966) have also failed to confirm the intellectual patterns of high verbal and low performance scores (Sarason & Sarason, 1947; Garrett & Levine, 1962) found in studies conducted on brain injured children in the past. This contradiction may stem in part from the fact that early subjects were cerebral palsied, later ones were not. Indeed, a recent study (Hertzog, Bortner & Birch, 1969) asked the question of whether children with known brain damage show organic signs. In terms of this study the question emerges - given children with brain injury in two diagnostic categories (spina bifida with hydrocephalus vs. cerebral palsy) will they differ? The issues have been further complicated in the past two decades since the management of children with behavior disturbances and learning disorders have become identified with the notion of brain damage. This emphasis on the hyperactive, learning disabled child has led to the neglect of imaginative approaches to educational diagnosis and management of the brain damaged child with motor defect.

This study poses two questions which may help illuminate aspects of this controversial landscape. 1) Are there different patterns of cognitive functioning in children with different kinds of brain injury, as well as between brain injured and non-brain injured children along the lines of questions raised previously? 2) Are there implications for teaching behavior?

4. What Are Parameters of Teacher Behavior in the Classroom?

Current interest in the teacher's activity may be related to three sources: (a) Social critics of traditional education, particularly those concerned with children who deviate from the norm, e.g., ghetto children (Holt, 1964), emotionally disturbed children (Brown, et al., 1969), are calling for new examination of classrooms. b) Ecologic inquiries fostered by Barker (1967) and his colleagues have developed tools for approaching the observation of naturalistic situations. c) In Head Start Programs there has been repeated controversy between program or process people, and evaluators or products people (Rossi & Williams, 1972). The former claim the latter's measurements are irrelevant to the content of programs. The latter claim that there are certain standard ways of examining outcomes which cannot be ignored, e.g., I.Q., academic skills. Hard data and theory on occurrences in classrooms may help describe programs in a way which might take into account both poles of criticism emanating from products and process people.

Systematic studies of classroom behavior are relatively recent. The best known work on the analysis of classroom behavior, Flanders (1970), was concerned mostly with older children and relied on the analysis of verbal behavior in the classroom. Because the teacher talks more in the traditional class, his system devotes more categories to the teacher than the student. This lecture method is clearly inappropriate for preschool children. However, several systems developed on preschool non-handicapped children have emerged in the past decade (Wilensky, 1966; Caldwell, 1967; Gump, 1971; Soar & Soar, 1972). The primary aims of most of these studies have been to develop adequate descriptions of the child's classroom environment or the teacher's behavior. There has been little replication and most of the work has been concerned with the development of new tools for observation. The substantive yield, that is, information sufficiently potent to change or evaluate practice, therefore, has not yet emerged. There is little literature which deals with the basic issues confronting the teacher; what is the optimum number of children in a class?, what kinds of materials should be used for what goals?, and what is the best way of presenting materials? There is still less operations research dealing with the processes involved in teaching.

Techniques of naturalistic observation in the classroom might then be a useful step to describe what occurs in the classrooms of preschool, handicapped children. The techniques may help to delineate differential patterns of teacher behavior for different preschool handicapped children.

5. Cognitive Functioning and Parameters of Teaching Behavior

In the classroom, what aspects of the child is the teacher responding to? Rosenthal and his colleagues (1968) suggested that the teacher's expectancies about the child, based on test scores which have been reported to her, exert a powerful effect on her behavior. Although some may dispute the existence of a Rosenthal-affect, one might even grant the point and still ask - what if the teacher has no test scores to go by?

Are patterns of teaching behavior related to patterns of cognitive functioning? This clearly underlies the logic and the findings with regard to I.Q. and achievement. For preschool handicapped children either measure or both measures may be questionable. If the child's behavior and the teacher's behavior can be related in predictable ways, it provides a base for theory development as well as for assessment. If they are not then the value of assessment from an educator's standpoint may be further questioned. In a review of the status of nursery school teaching, Sears and Dowley (Gage, 1963) indicated several research needs: a) Very few studies have attempted to examine in the less controlled naturalistic setting of the classroom situation those variables found to be relevant in controlled experimental situations. b) Knowledge about the effect of teaching methods or roles cannot be gained without taking into account characteristics of the children to whom the methods are directed. Similar kinds of reasoning would seem to be behind priorities for research recommended by La Crosse, et al. (1970) who argue that naturalistic and classroom study of children 0-6 years should be encouraged. They noted that since World War II laboratory and psychometric approaches have increased in rigor, but have grown estranged from actual practice.

There have been practically no studies in this direction with regard to brain injured children. The handful of studies bearing on educational intervention include the use of operant conditioning approaches (Allen et al., 1967), a Montessori nursery school approach (Argy, 1965), environmental isolation (Cruickshank et al., 1967), and its opposite, environmental bombardment (Barrett, et al., 1967). These studies are of a classical clinical type, showing whether or not a given intervention works. The present investigation is concerned with an intermediate step. It examines a child's competence and response style in an evaluation situation and in a naturalistic preschool setting. It also examines a teacher's style of instructing the child and the relationship between a teacher's style of response and a child's response style. This study seeks to answer the questions: Is what is taught related to characteristics of children? Are there aspects of the classroom which are rearranged to take these characteristics into account?

METHOD

Subjects

The subjects for this study were 55 handicapped brain injured and non-brain injured children, ranging in age from 28 months to 86 months with a median age of 55 months. The sample included 29 males and 26 females. Demographic characteristics of each child such as medical diagnosis and disability, socio-economic status, ethnicity, language and speech development are displayed in Appendix A and described briefly below.

Medical Diagnosis. There were 45 brain injured children, 26 were medically diagnosed as cerebral palsy, 12 were spina bifida, and 7 were other types of brain injury, including minimal brain dysfunction, polio encephalitis, and osteopetrosis with anemia. Ten of the children with spina bifida were shunted during infancy for hydrocephalus. The remaining two children revealed no history of hydrocephalus. Thirty of the brain injured subjects were wheelchair bound, as compared to 15 who were able to ambulate. Upper extremity involvement was presented in 12 of the wheelchair bound children, and 7 of the ambulators.

The non-brain injured sample included ten children, with medical diagnoses of juvenile rheumatoid arthritis, myopathy, skeletal deformities, post polio and amputations. Four of these children were wheelchair bound, with upper extremity involvement present in three out of four. Six of the non-brain injured children were able to ambulate; three of these children also had involvement in their upper extremities.

Socio-Economic Status. The sample included eleven children (20%) from families with a high socio-economic status, fifteen (28%) from middle SES families and twenty-nine from low SES families. Of the families with low socio-economic status, 23 (41%) received their incomes from blue collar occupations, while 6 (11%) received public assistance. This determination of socio-economic status was based on the scale devised from Langner and Michael in Life Stress and Mental Health, 1963, which takes into account education, occupation and income of the head of the household. Income level for the scale was updated in accordance with information supplied by the Community Council of Greater New York, 1968. Forty-five of these fifty-five families were intact, with both parents (natural or foster) alive and living with the subject.

Ethnicity. Among this sample were 28 Caucasian Americans, 10 Black Americans, 14 first generation Americans and 3 foreign children who came to the United States specifically for the purpose of obtaining medical treatment. The first generation Americans were comprised of children whose parents migrated to the United States from Italy, China, Turkey, Spain, Germany, Ecuador, Cuba, Dominican Republic and Puerto Rico.

Language. Thirty-nine of the 55 subjects were from English-speaking homes, while 9 were from Spanish speaking families. Of the remaining 7 children, three were from bi-lingual homes, speaking both Italian and English, one French, one Turkish, one Chinese and one Portuguese.

Speech. Speech development was normal in 34 of the children. Ten children had intelligible speech although some difficulty in understanding them was noted. Eight children had unintelligible speech, while three had no speech at all.

Description of the Setting

The setting of this study was a pre-school program in a rehabilitation center. The school services both in and out patients and is part of a comprehensive rehabilitation program which includes half-hour periods of school as well as physical therapy, speech, psychology and recreation. The philosophy of the pre-school emphasizes a developmental-interaction approach (Shapiro and Biber, 1972) applied to physically handicapped children. Both the educational philosophy and the design of the school are described in detail by Gordon (1972). For this study, one particular aspect, the visual-motor development activity was selected for intensive observation. This domain was chosen because it has been shown that these skills are impaired in children with cerebral palsy and spina bifida. In this part of the program, one of the aims is to develop and sustain a child's purposive behavior by encouraging his exploration of the environment, as well as by instructing him in families of tasks in the visual-motor area which are close to his level of competence. The teacher's goal is not to develop a child's mastery of a specific task, but rather to develop a child's sense of competence, an interest in learning, and a problem-solving orientation to tasks. In this study purposive behavior was defined as task-relevant behavior or "work."

Method

The method of this study had four parts:

- A) Evaluation
- B) Five Initial Observations of Pupil-Teacher Interaction in the Classroom
- C) Five Follow-Up Observations of Pupil-Teacher Interaction in the Classroom
- D) An Individual Tutorial Session

A) Evaluation

During the first week of admission to the pediatric service, each child received a comprehensive evaluation by a medical rehabilitation team to establish medical diagnosis and disability, and to obtain initial demographic (social) data including socio-economic status of the family, birth order, ethnic background, language spoken in the home as well as an estimate for speech development.

During the second week of the child's pediatric program he was seen for evaluation by a psychologist, while an independent observer recorded a detailed protocol of the child's behavior and verbalizations. An initial informal contact was made in the rehabilitation unit prior to evaluation in order to prepare the child for the session, and promote better rapport.

The evaluation measures included the Stanford-Binet Intelligence Test Form L-M, and two educational toys, a five-hole form box involving form discrimination and the Montessori cylinders involving size discrimination. The Stanford-Binet was scored for competence and response style according to a scheme developed by Hertzog et al. (1968). The major categories of style were work, non-work, verbal and non-verbal. The subcategories of work included delimitation and spontaneous extension while non-work subcategories were negation, substitution, request for aid, competence and passive. The formbox and Montessori cylinders were scored for number of trials to complete the task, magnitude of error, and type of error such as form, rotation, spoils (Gordon, et al. 1972). An example of one child's performance on the Stanford-Binet and educational toys is in Appendix B.

Each child was rated on a three-point scale for emotional independence, problem-solving behavior and degree of rapport with the examiner. These ratings were made by the examiner and recorder following the evaluation. On each dimension of behavior, a score of one was the most desirable rating while three was the least desirable. For example, a rating of one on the emotional independence scale indicated minimum praise and support from the examiner, while a rating of three indicated maximum support. The scales were then weighted in order of the importance of their contribution to an overall temperament factor. Problem-solving behavior, thought to be the least important quality of temperament, was given a weight of one. Emotional independence was weighted two, while rapport was weighted three. Each child was assigned a sum score for the three scales, these scores ranging from six to eighteen. In addition to a temperament rating, the child's activity level was also estimated based on clinical judgment for hyperactivity, hypoactivity and normal activity level.

B) Initial Observation of Pupil-Teacher Interaction in the Classroom

During the third week of the child's pediatric program he was observed in the preschool setting. In this school children are scheduled for several half hour class periods. The periods selected for study were the four half hours from 9:00 to 10:00 and from 10:30 to 11:30, when performance in visuomotor functioning is stressed over socialization activities. The materials used were of fixed demand or structured such as a puzzle (Type I) or more open ended or unstructured such as house play and painting (Type II). A ten-minute record of behavior was taken during the middle ten minutes of a half hour class period. At this central interval, the child was more likely to be involved at the mid-point of an activity rather than in preparation or cleaning up. The child was situated anywhere in the classroom but was facing the one-way vision room so that the recorder, who was situated in the observation room, had an adequate view of his activity.

The observer recorded five ten-minute samples of behavior taken on five separated days during the child's third week of school. The observer reported (into a dictaphone) everything the child did and said as well as all the behavior directed toward the child. In this setting, a great deal of the interaction between child and environment included objects, teachers and other children.

This procedure has several advantages. Although each observation is centered on one particular child, a great deal is revealed about teacher behavior in the classroom. In addition, the observer has an overall view of the ecology of the classroom. For example, the face sheet for each protocol gives the name of each child in the classroom, area of work and activity of each child as well as the number of teachers. This yields information about type of task and pupil-teacher ratio. There are usually two teachers in the room with a maximum number of six children. Results of pilot investigations showed that the teachers did not differ in their style of teaching and could be considered a composite teacher. The typed protocol of the behavior sample with notations serves as a permanent record of raw data. This method was developed after a review of the research in the area of naturalistic observation (Caldwell, 1967; Wilensky, 1966) and through several meetings with teachers, as well as preliminary pilot investigations. A manual, Directions for Recording, is presented in Appendix C.

The typed protocols, describing pupil-teacher interaction, were classified at five levels.

<u>Level I</u>	Number of Teacher Interventions
	Number of Child Responses
	Number of Responses made by other children
	which are directed toward the subject

Level II

Number of Child Responses categorized as:

- A. Evokes - child tries to initiate an action
- B. Responds - child responds to an act initiated by either a teacher or child
- C. Evoke-Responds-an interaction which has components of both Evoke and Respond
- D. Independent - child works alone

The object of each type of response is also noted. If an Evoke is directed toward a teacher, it is a E_T response.

Level III

Child's Response Style:

The Response Style classification of work vs. non-work responses by Hertzog et al. (1968) was modified for classroom performance. Three categories were added: Request for Materials, Request for Recognition, and Social.

Level IV

Teacher Response Styles were classified into five major areas:

Preparation of Child and Materials	Verbal
	Non-Verbal
Instructional	Verbal
	Non-Verbal
Controlling	Verbal
	Non-Verbal
Social	Verbal
	Non-Verbal
Miscellaneous	Verbal
	Non-Verbal

Because the Instructional category was a predominant one, it was analyzed in greater detail. Instructional responses were classified into the two main classifications of verbal and non-verbal and then into the following detailed categories:

Level V

Verbal

Information Giving - when the teacher states any facts, concepts or ideas.

Eliciting A Response - when the teacher attempts to engage the child in activities through questions or instructions to respond.

Non-Verbal

Showing - when the teacher demonstrates.

Assisting - when the teacher assists the child in performing the task.

Presenting - when the teacher presents materials in order to elicit a response.

Directing or Redirecting - when the teacher's intent is to re-focus attention. This is done verbally. Example: calling child's name.

Reinforcing - when the teacher gives positive or negative verbal reinforcement such as simple confirmations, negations and corrective negations.

Role Playing - when the teacher participates verbally along with the child in an activity. Example: dramatic play.

Positioning - when the teacher's intent is to re-focus attention. This is done non-verbally and often involves positioning child or materials.

Reinforcing - when the teacher gives positive or negative non-verbal reinforcement such as nodding of yes or no.

Role Playing - when the teacher participates non-verbally along with the child in an activity.

A manual, Directions for Numbering and Scoring Protocols, with examples, is in Appendix D. A behavior sample of one child's classroom session with scoring and summary is in Appendix E.

C) Follow-Up Observations of Pupil-Teacher Interaction in the Classroom

The procedure of the initial observations was used in the Follow-Up Observations after the child had a four-week adjustment period in school. The observer recorded five ten-minute samples of behavior taken on separate days during the child's seventh week of school.

D) Individual Tutorial Session

The purpose for including an individual session with a one-to-one pupil-teacher relationship was to provide an optimum situation in which to observe the child's classroom behavior.

The teacher was limited to six educational toys which were selected to meet specific criterion through discussion by the teachers and investigators of this study. The six toys were of varying levels of difficulty and were structured or Type I tasks. This selection provided an adequate basal and ceiling level for the children of this study. The use of these materials involves several cognitive skills such as size, shape, and color discrimination, visual organization, visual-motor coordination, memory and matching. The materials also can be used for language stimulation. The six toys ranking in order of least to most difficult (1-6) were: 1) Abacus beads with different colored beads; 2) Simplex puzzle isolated pieces such as dog, chair, etc.; 3) Form box (used in the evaluation); 4) Montessori cylinders (used in the evaluation); 5) Complex puzzle boy and girl; 6) Faces--five pair of similar faces used for matching.

The procedure for observing the individual session was similar to that of the classroom observations. The teacher was situated with the child in the corner of the classroom during a regular school session. Each observation of the individual session, like the classroom session, was ten minutes in duration. Similar to the classroom recording, the observer reported into a dictaphone all of the significant behavior emitted by the child as well as all the behavior directed toward the child.

In addition, this session was videotaped to provide a permanent record. The taped film was used as a supplement to the evaluation made by the psychologist. The child's response style was examined for the following behavior: 1) Does a child look while performing a trial? 2) Does he pre-select or look before performing a trial? 3) How often does he look away from the task? 4) Is his eye-hand coordination adequate?

After the individual session was completed, the teacher reported her intent as she worked with the child. Teacher intent reports were used as a qualitative supplement to the information of the behavior protocols and served in the development of the analyses and scoring of protocols.

Reliability

Reliability information has been established for two recorders taking the behavioral sample, for two scorers classifying the child's response style on the Stanford-Binet, and for two scorers classifying the five levels of the classroom protocols.

Reliability and Training of Observers

Because the training of observers is an important aspect of a behavioral investigation, a study was made of inter-observer reliability. In addition to following the directions for recording, two recorders observed each other in taking several behavioral samples. Inter-observer comparison was then made by stationing two recorders in separate observation rooms, both getting an adequate view of the child. Five ten-minute samples of behavior, of two children, were taken by the two recorders. The protocols for two observers were scored yielding the percent of response for Levels II through V. These are presented in Table 1. Table 1 shows the percent of responses, for the various levels, to be similar for the two recorders. A further comparison of the two recorders was made through rank order correlational procedures. These correlations ranged from .81-.95 and are shown in Table 2.

Table 1

Reliability of Inter-Recorders

Frequencies in Percent for Each Level for Five Sessions

		<u>Recorder 1</u>	<u>Recorder 2</u>		
Level II					
Evoke		10.4%	7.8%		
Responds		24.4%	25.2%		
Evoke-Responds		10.4%	20.6%		
Independent		54.8%	46.4%		
Level III					
	<u>Verbal</u>	<u>Non-Verbal</u>			
	<u>Recorder 1</u>	<u>Recorder 2</u>	<u>Recorder 1</u>	<u>Recorder 2</u>	
Work	4.2	7.8	56.0	62.8	
Spontaneous Extension	0.0	0.0	0.0	0.0	
Request Materials	2.8	1.2	1.6	1.8	
Request Recognition	1.4	0.8	1.4	1.6	
Negation	2.2	1.4	4.0	3.2	
Substitution	0.6	0.0	4.8	3.4	
Request Aid	1.2	1.0	0.8	0.0	
Competence	0.0	0.0	0.0	0.0	
Passive	0.0	0.0	3.2	1.0	
Social	1.0	0.8	13.8	13.0	
Level IV					
	<u>Verbal</u>	<u>Non-Verbal</u>			
	<u>Recorder 1</u>	<u>Recorder 2</u>	<u>Recorder 1</u>	<u>Recorder 2</u>	
Preparational	3.6	3.0	20.8	22.4	
Instructional	28.0	34.6	29.4	27.4	
Controlling	2.0	1.4	2.0	2.0	
Social	1.4	0.4	0.4	3.0	
Miscellaneous	3.0	1.4	9.4	4.0	
Level V					
	<u>Verbal</u>	<u>Non-Verbal</u>			
	<u>Recorder 1</u>	<u>Recorder 2</u>	<u>Recorder 1</u>	<u>Recorder 2</u>	
Information-giving	13.8	19.0	Showing	21.6	22.0
Eliciting a response	21.2	21.4	Assisting	11.6	10.4
Directing or redirecting	2.2	1.4	Presenting	7.6	8.0
Reinforcing	10.2	9.6	Positioning	3.4	2.0
Role playing	2.6	2.6	Reinforcing	1.6	2.2
			Role Playing	4.2	0.4

Table 2

Rank Order Correlation Coefficients
Between Two Recorders for Five Sessions

Level	Correlation Coefficient
II Child Responses (Independent, Evoke, Respond, Evoke-Respond)	.95**
III Child Response Style (Modified version of Hertzog et al., 1968)	.94*
IV Teacher Response Style	.81*
V Instructional Interventions subcategories	.86*

*p < .01

**N too small for probability statement

Reliability of Response Style in the Stanford-Binet

The percent agreement between two independent scorers classifying the Stanford-Binet data according to the scheme developed by Hertzog et al. (1968) was .95 for N=24 subjects. Because of the high level of agreement, formal reliability studies were not carried out on the remaining 31 subjects. However, when responses were difficult to classify, they were discussed by two scorers and a joint decision was made.

Reliability of Classroom Protocols

The percent agreement between two independent scorers for level I through V of the behavior protocols are reported in Table 3. The percent agreement for N=45 protocols was over 90 percent for all five levels. Although reliability between scorers was good, responses which were difficult to classify on the remaining protocols were discussed by two scorers for joint decision.

Table 3

Percent Agreement of Two Independent Scorers

	Level	Percent Agreement N=45 Protocols
I	Number of Teacher Interventions Number of Child Responses	.93 .93
II	Child Responses (Independent, Evoke, Respond, Evoke-Respond)	.91
III	Child Response Style (Modified version of Hertzog, et al., 1968)	.92
IV	Teacher Response Style (Major Categories: Preparation, Instructional, Control, Social, Miscellaneous, Verbal and Non-Verbal)	.94
V	Instructional Interventions subcategories	.92

RESULTS

Factor Analysis of Four Sets of Data

By virtue of the diversity of the issues studied and the complexity of the means of measurement used, situations investigated and people observed, a large data base emerged. For each of 55 children, measurements on 53 variables from the evaluation session, 26 variables of child responses and 25 measures of teacher interventions in five classroom sessions were analyzed. In order to reduce this large data base to manageable size, the technique of factor analysis was frequently employed. This form of statistical analysis, now rendered feasible through high speed computers, replaced extensively large tables of intercorrelations, which are presented in Appendix F, with small sets of macro variables which by definition are independent of one another. Knowledge of these factors served a two fold purpose. Firstly, by indicating which sets of the original measures were related to each other. Secondly, by providing factor scores which may be used to compare children with respect to one another. The section which follows describes the results of four factor analyses and relevant interrelationships among them. Furthermore, it provided a set of dependent variables which were used for further analyses.

1. The Child's Behavior During the Psychological Evaluation: Unidimensional or Multi-Dimensional

Factor analysis of evaluation (Table 4) measures which were based on different parameters of response style generated from the Stanford Binet, form box and Montessori cylinders resulted in three independent dimensions which accounted for 44% of the variance.

A) Factor E_1 Competence, the ability to turn out a good product in solving problems, was the major underlying dimension accounting for 26% of the variance. Competence was manifested differently in each of the tasks. On the Stanford Binet it was exhibited by more problems solved and, therefore, higher mental age. On the educational toys the number of correct placements was the most powerful indicator of competence. Each of these variables yielded high factor loadings (mental age -.90, form box - number correct -.89, cylinders - number correct -.51). Competence was also reflected as a facet of cognitive style on the form box (form errors .84, basket errors .34, teacher assists .86) as well as on the cylinders (teacher assists .76, baskets .43). This suggested that aspects of what was thought of as cognitive style at the low and moderate ranges of the educational materials significantly overlapped with competence. Aspects of response style on the Stanford Binet also reflected competence, particularly verbal responses (-.60), spontaneous extension (-.44), verbal work (-.61) and responding to tasks above the level of competence by saying "I don't know" (-.69).

B) Factor E_2 , which accounted for 11% of the variance, may be regarded as a non work factor (non work .89) which is more related to

Table 4 Factor Analysis of Evaluation

Variable	Factor E1(.26)*	Factor E2(.37)*	Factor E3(.44)*
Variable	Loading	Variable	Loading
Sum Rot. & Form Er. FB	.87	Sum Work SB	.57
Grp. Class FB	.87	# Non Verbal Work SB	.52
# Teacher Assists FB	.86	# Verbal Work SB	.48
# Trials FB	.86	# Rotation Er. FB	.48
# Form Er. FB	.84	Ratio Rot; Form Er FB	.45
Grp. Class Cyl.	.81	Sex	.37
# Trials Cyl.	.79		
# Teacher Assists Cyl.	.76	SES	-.41
# Errors Cyl.	.70	# Lids Form Box	-.38
# Non-Verbal Non-Work SB	.53		
Speech	.44		
# Baskets Cyl.	.43		
# Baskets FB	.34		
MA	-.90		
# Correct Form Box	-.89		
# Competence SB	-.69		
Rasal-Ceiling Spread SB	-.64		
IQ	-.64		
# Verbal Work SB	-.61		
# Verbal Response SB	-.60		
Ratio Competence: Subs SB	-.53		
# Correct Cyl.	-.51		
CA	-.47		
# Spont. Ext. SB	-.44		

* Denotes cumulative proportion of the variance accounted for.

the way the child deals with difficult tasks than a mark of his inability to perform them. It is a response style related more to temperament than to cognitive competence as may be seen from the following items: verbal non work - Stanford Binet (.71), substitution (.67) and negation (.68) responses when failing items on the Stanford Binet, non verbal responses (.56), the number of sessions required to complete the examination (.53) and the temperament ratings (.51). A high score on this factor suggested a child who may make non task relevant responses, be uncooperative and difficult to test in the evaluation.

C) Factor E_3 accounted for 7% of the variance and represented an ability to maintain task related behavior. It was a manifestation of response style (work .57, verbal work .48, non verbal work .52 on the Stanford Binet) as well as cognitive style (form box - rotation errors .48, ratio of rotation to form errors .45, lid responses -.38). It appeared independent of competence and did not seem to tap temperament.

It would appear that all of the evaluation tasks used in the psychological examination could be employed to assess competence. The Stanford Binet contributed indices of response style (factors E_2 and E_3) and the form box contributed aspects of cognitive style unrelated to competence.

2. Observations of Individual Tutorial Sessions

Factor analyses of the individual tutorial session yielded two factors which accounted for 53% of the variance (Table 5).

A) Factor IT_1 (37% of the variance) reflected the child's competence as manifested in his style of approach rather than the finished product of his problem solving efforts. This factor separated children who appeared to act on the basis of preselection or prior judgment (.82), looked at their activities while performing (.69), did not look around at distractions (.66) and maintained smooth motor movement with the materials (.84) from children who did not exhibit these behaviors. Some of the teacher's alteration of stimuli entered in the sense that children with high loadings on the factor elicited teacher activity which extended the task upwards rather than downwards (.49).

B) Factor IT_2 (16% of the variance) reflected the teacher's judgment of the child's competence as manifested by her alteration of the stimuli. For example, for a more competent child the teacher introduced higher level tasks (-.85), increased the number of tasks (-.82) and altered her instructions to provide more complex demands on the same task (.47). For a less competent child the teacher's tactics were aimed at reducing task complexity to a more concrete level.

Table 5

Factor Analysis of Individual Tutorial Session

<u>Factor IT₁ (.37)*</u>		<u>Factor IT₂ (.53)*</u>	
<u>Variable</u>	<u>Loading</u>	<u>Variable</u>	<u>Loading</u>
Eye-Hand	.84	Highest Level of Tasks	-.85
Preselects	.82	Number of Tasks	-.82
Looks While Doing	.69	Extension Level	.47
Distractibility	.66		
Extension Level	.49		

*Denotes cumulative proportion of the variance accounted for.

3. The Child in the Classroom

A three factor solution which accounted for 49% of the variance helped reduce this network of correlations (Table 6).

A) Factor CC_1 accounted for 20% of the variance and was a dimension which incorporated a range of activities clustering around and including both work and non work. Sum work had the highest positive loading (.75) and sum non work had the highest negative loading (-.86). At the positive pole were non verbal work (.73), independent work (.69) and child responses: sum (.53), non verbal (.44). At the negative pole were non work: independent (-.81) and with the teacher (-.65) as well as substitution (-.72), negation (-.67) and passive (-.63), all non task relevant responses. The variance suggested the importance of work in the classroom and the bipolar nature of the factor was puzzling. This point will be discussed later.

B) Factor CC_2 , which accounted for 17% of the variance, was basically a factor of inactive social behavior (sum social .93) manifested primarily by its non verbal nature (.90), looking at other children (.85) and other social (.55). It was more likely to occur in the context of a high pupil-teacher ratio where the child had less opportunity to work with a teacher (-.28).

C) Factor CC_3 , which accounted for 12% of the variance, appeared to measure a combination of assertive behavior and social involvement. A child who scored high on this factor had the following cluster of behaviors: 1) evoke responses .85, 2) verbal responses .79, 3) peer interaction .73, 4) verbal work .69, 5) verbal social .62, 6) request recognition .59, 7) independent creative play .41, 8) request materials .35, and 9) saying "I can't do it" when tasks were too difficult .28.

4. The Teacher in the Classroom

Two factors accounted for 63% of the variance in the correlation of measures of the teacher's behavior in the class (Table 7).

A) TC_1 (49% of the variance) consisted generally of items in non verbal teaching (e.g., non verbal intervention, preparation of the child for an activity, non verbal instruction, assisting, showing or demonstrating) and appeared oriented to the lower level child.

B) TC_2 (14% of the variance) consisted of interventions aimed for the higher level child and included more verbal types of instruction, observing the child (non verbal miscellaneous), giving information and providing feedback primarily through praising. These two distinct patterns of teaching behavior which occurred can explain most of the observations.

Table 6

Factor Analysis of Child Variables in the Classroom

Variable	Factor CC_1 (.20)*	Factor CC_2 (.37)*	Factor CC_3 (.49)*
	Loading	Variable	Loading
Sum Work	.75	Non-Verbal Social	.90
Non-Verbal Work	.73	Sum Social	.93
Independent Work	.69	Social Looking	.85
Sum Child Responses	.53	Other Social	.55
Non-Verbal Child Responses	.44	Request Aid	.20
Sum Non-Work	-.86	Work with Teacher	-.28
Independent Non-Work	-.81		
Substitution	-.72		
Negation	-.67		
Non-Work/Teacher	-.65		
Passive	-.63		
		Evoke	.85
		Verbal Child Responses	.79
		Peer Interaction	.73
		Verbal Work	.69
		Verbal Social	.62
		Request Recognition	.59
		Spontaneous Extension	.41
		Request Material	.35
		Competence	.28

* Denotes cumulative proportion of the variance accounted for.

Table 7 Factor Analysis of Teacher Variables

Factor TC1 (.49)*		Factor TC2 (.63)*	
<u>Variable</u>	<u>Loading</u>	<u>Variable</u>	<u>Loading</u>
Non-Verbal Prep.	.86	Sum Feedback	.88
Sum Prep.	.85	Positive Reinf.	.87
Non-Verbal Inst.	.85	Sum Misc.	.84
Non-Verbal Teacher Int.	.84	Non-Verbal Misc.	.82
Show	.77	Verbal Inst.	.76
Teacher Interventions	.76	Verbal Teacher Int.	.74
Redirect-Positions	.74	Information Giving	.71
Assist	.74	Elicits A Response	.67
Sum Instruction	.70	Sum Social	.67
Presents	.69	Sum Inst.	.66
Elicits A Response	.60	Teacher Int.	.64
Sum Control	.55	Corrective Neg.	.49
Verbal Prep.	.52	Verbal Misc.	.41
		Negative Reinf.	.35

*Denotes cumulative proportion of the variance accounted for.

5. Interrelationships of the Behavior of the Child

The most striking finding in Table 8 was the all pervasive reflection of competence. A child who was competent in the psychological evaluation (E_1) used superior means of solving problems in the individual tutorial session (IT_1 , $r=.57$, $p<.01$) and also received a different pattern of tasks and task conditions (IT_2 , $r=.52$, $p<.01$). In the classroom the child engaged in work as opposed to non work behavior (CC_1 , $r=.46$, $p<.01$)* and was more assertive and sociable (CC_2 , $r=.33$, $p<.05$)*. He also elicited fewer interventions of a non verbal style on the part of the teacher (TC_1 , $r=.61$, $p<.01$). The fact that non work as a manifestation of temperament on the psychological evaluation (E_2) did not appear in the individual tutorial session but did appear in the child's behavior in the classroom, suggested that the tutorial session was indeed more supportive and less frustrating. A negativistic or temperamental child who was difficult to manage in the evaluation was not inclined to be actively looking at other children in the classroom (CC_2 , $r=-.35$, $p<.01$) and generally elicited a verbal type of intervention from the teacher (TC_2 , $r=.37$, $p<.01$). The picture which emerged when the pattern associated with the two psychological evaluation factors were juxtaposed suggested that the teacher dealt with children who were cognitively incompetent by non verbal patterns of intervention and with children who may be competent but negativistic with verbal patterns. In the low functioning child there were frequent interventions marked by a wide variety of non verbal behaviors (13 items had loadings of .52 and above). In the child with active avoidance tendencies in the evaluation, the teacher responded with frequent verbal interaction comprised of both instruction and feedback. The clear cut differences in correlates which emerged from the two factors were striking. Factor E_3 , a combined cognitive and response style factor, did not appear in any other situation. Whether it was specific to psychological testing or whether the range of other situations which were sampled were too narrow to elicit it, could not be teased out of these data.

In the individual tutorial session both the way the child acted and the way the teacher acted were directly related to the child's competence in the psychological evaluation (IT_1 , $r=.57$, $p<.01$; IT_2 , $r=.52$, $p<.01$). They were also directly related to the teacher's pattern of behavior in the classroom. The child who responded with a lower level cognitive style in the tutorial session (IT_1 , $r=.50$, $p<.01$) and the one who elicited alterations of tasks in the direction of simplification and reduced demands (IT_2 , $r=.30$, $p<.05$) also elicited a non verbal pattern of frequent intervention on the part of the teacher.

* The signs of the correlations have been reversed in the text because a high score on factor E_1 is a measure of incompetence (low mental age, trials on the form box and cylinders).

Table 8
Correlation Coefficients of Factor Scores
for Evaluation, Tutorial Session, Child
Classroom and Teacher Classroom Variables

	1	2	3	4	5	6	7	8	9	10
	E ₁	E ₂	E ₃	IT ₁	IT ₂	CC ₁	CC ₂	CC ₃	TC ₁	TC ₂
1) E ₁ (Competence)				.57**	.52**	-.46**		-.33*	.61**	
2) E ₂ (Non Work)							-.35**			.37**
3) E ₃ (Work on Zone of Comp.)										
4) IT ₁ (Style in Problem Solving)									.50**	
5) IT ₂ (Teacher's Task)									.30*	
6) CC ₁ (Work vs. Non Work)									.41**	
7) CC ₂ (Passive Social)										
8) CC ₃ (Social & Assert.)									.46**	
9) TC ₁ (Non Verbal Instruction)										
10) TC ₂ (Verbal In- struction)										

Note: Only these correlation coefficients which are significant
are reported.

* p < .05

** p < .01

The child's behavior in the classroom was also of interest. In addition to differential relationships with competence and non work in the psychological evaluation, the child's behavior elicited differential patterns in the teacher's behavior which emerged in these measures. The child with a non work style in the classroom and the child who was not assertive and socially involved tended to elicit a more active pattern of non verbal behavior from the teacher (CC_1 , $r=.41$, $p<.01$; CC_2 , $r=.46$, $p<.01$).

6. A Further Comparison of the Psychological Evaluation and the Classroom

The fact that a number of similar response style measures (work vs non work, verbal vs non verbal) were obtained for both the Stanford Binet and the classroom permitted the more precise identification of the features of behavior being sampled (Table 9). Both situations clearly elicited purposeful task involvement, with the classroom (Mean=79%, SD=8.9%) succeeding even more than the test situation (Mean=68.7%, SD=15.8%) in maintaining work behavior. The fact that in four of every five instances the child's behaviors were work related suggested that teachers in the classroom succeeded to a remarkable degree in maintaining a child's task relevant behavior. This finding confirmed the initial impression that the underlying philosophy of the classroom was to maintain work behavior. The fact that the Stanford Binet elicited more verbal responses (Mean=46.5%, SD=19.9%) than the class (Mean=16.3%, SD=10.1%) was clearly a function of the particular sample of classroom behavior which was observed.

Does response style in the test situation reflect response style in the classroom? While the factor analyses answer this question, one might probe a bit deeper in terms of asking whether similar categories e.g., work, verbal, are indeed similar in their meaning across situations. Examination of the correlations in Table 10 suggested that verbal style on the Stanford Binet was associated with verbal style in the classroom (verbal $r=.67$, $p<.01$; verbal work $r=.69$, $p<.01$). Work vs non work on the Stanford Binet, however, was not so indicative of similar behavior in the classroom. The specific components of non work which were exhibited in the evaluation were not similarly reflected in the classroom, probably because in the classroom the task demand was not so specific and was usually directed toward the child's level of competence. For example, the child who said "I don't know" while not working on the Stanford Binet engaged in fewer non work activities in the classroom ($r=.31$, $p<.05$).

Table 9

Means and Standard Deviations of Children's
Response Style in the Evaluation and Classroom

	<u>Evaluation</u>		<u>Classroom Sessions</u>	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
<u>Response Style, Percents</u>				
Verbal	46.5	19.9	16.3	10.1
Non-Verbal	53.5	19.8	83.6	10.1
Work	68.7	15.8	79.4	8.9
Non-Work	30.2	13.3	7.2	5.9
<u>Work Subcategories</u>				
Verbal Work	46.1	19.4	15.5	9.8
Spontaneous Extension	1.3	3.1	0.7	1.7
<u>Non-Work Categories</u>				
Negation	19.8	18.1	26.5	23.1
Substitution	37.5	23.8	33.6	23.5
Request Aid	7.4	10.0	30.5	25.9
Competence ("I don't know")	20.9	28.7	0.8	2.9
Passive	14.5	17.1	8.6	14.0

Table 10

Correlation Coefficients of Child Characteristics on
the Evaluation with Percent Child Responses in the Classroom

Stanford Binet	Classroom Responses					Competence (I don't know)
	Verbal	Work	Verbal Work	Non Work	Substitution	
Verbal	.67**	.28*	.69**	-.32*	X	X
Work	X	X	X	-.28*	X	X
Verbal Work	.62**	X	.64**	-.31*	X	X
Non Work	X	X	X	.43**	X	X
Substitution	X	X	X	.40**	.35**	X
Competence (I don't know)	.29*	X	X	-.31*	X	X

Note: Only those correlation coefficients which are significant
are reported.

* $p < .05$

** $p < .01$

Medical Diagnosis and Psychological Functioning

The total sample was divided into four groups by medical diagnosis: cerebral palsy, spina bifida, other brain injured, and non-brain injured. A brief examination of performance on the psychological examination revealed that although equal in mental age, the groups differed in chronological age and intelligence quotient, and showed different patterns of mental growth. For example, mental age and chronologic age were more highly correlated ($p < .01$) in the controls ($r = .89$, $N = 10$), than in either the spina bifida ($r = .50$, $N = 12$) or the cerebral palsy children ($r = .64$, $N = 26$). At the risk of shrinking the sample even further it was therefore decided to match subjects more precisely by mental age, chronologic age and intelligence quotient. (Analysis of covariance would be inappropriate because of the multiplicity of variables). This procedure of exact matching yielded the following subjects for comparisons on Mann Whitney U tests: (a) 8 cerebral palsy vs. 6 non-brain injured controls, (b) 7 spina bifida vs. 7 controls, and (c) 11 spina bifida vs. 15 cerebral palsy children (Table 11). The purpose of this analysis was to answer the following questions: a) Do children with differing medical diagnoses (within and between categories of brain damage) act differently in the classroom? b) Do children with differing diagnoses receive different types of teacher intervention?

1. Non-Brain Injured Controls vs. Cerebral Palsy

In the classroom, non-brain injured children behaved differently from cerebral palsied children. For example, the controls made more responses in the classroom (factor 1). Their responses included requesting more recognition or attention for their accomplishments (factor 3) and creatively taking multiple roles in independent dramatic play (spontaneous extension; factor 3). In general, they were also more work oriented. At times when the teacher was with them, they made non-work responses (factor 1) such as actively refusing or rejecting the task (negation - factor 1). The non-brain injured children's social behavior was actively directed toward peers (factor 2). By way of contrast, when the cerebral palsy child was left on his own he just sat and looked at other children. This was seen by the high non-work (factor 1) behavior of the cerebral palsied children which occurred when the teacher was not working directly with them.

2. Non-Brain Injured Controls vs. Spina Bifida

The differences seen between the non-brain injured and spina bifida children were not as clear as those for the non-brain injured and cerebral palsy children. The non-brain injured children again made more responses in the classroom than the spina bifida children. In terms of teaching style, the spina bifida group received a greater proportion of teacher intervention which involved bringing the child back to a more purposeful task related behavior (redirect-positions, factor 2). This kind of teacher intervention would be in keeping with the distractible behavior seen in spina bifida children (Diller et al., 1969).

Table 11

Comparison of Child and Teacher Classroom Response Style for
Three Disability Groups

Non-brain Injured Controls and Cerebral Palsy

<u>Control (N=6) > Cerebral Palsy (N=8)</u>	<u>Cerebral Palsy (N=8) > Control (N=6)</u>
Number of Responses (1+)* $p < .01$	Independent Non-Work (1-)* $p < .05$
Spontaneous Ext. (3+)* $p < .05$	Non-Work (1-)* $p < .10$
Request Recog. (3+)* $p < .05$	Social Looking (2+)* $p < .05$
Work (1+)* $p < .05$	
Negation (1-)* $p < .05$	
Non-Work/Teacher (1-)* $p < .05$	
Other Social (2+)* $p < .05$	

Non-brain Injured Controls and Spina Bifida

<u>Control (N=7) > Spina Bifida (N=7)</u>	<u>Spina Bifida (N=7) > Control (N=7)</u>
Number of Responses (1+)* $p < .05$	Redirect-Positions (1+)** $p < .01$

Spina Bifida and Cerebral Palsy

<u>Spina Bifida (N=11) > Cerebral Palsy (N=15)</u>	<u>Cerebral Palsy (N=15) > Spina Bifida (N=11)</u>
Number of Child Responses (1+)* $p < .05$	Independent Work (1+)* $p < .01$
Verbal Child Responses (3+)* $p < .01$	Non-Verbal Work (1+)* $p < .05$
Request Recog. (3+)* $p < .01$	Independent Non-Work (1-)* $p < .10$
Work/Teacher (2-)* $p < .01$	Preparational (1+)** $p < .05$
Verbal Work (3+)* $p < .05$	Miscellaneous (2+)** $p < .01$
Non-Work/Teacher (1-)* $p < .10$	
Evoke (3+)* $p < .01$	
Instructional (1+, 2+)** $p < .01$	
Presents (1+)** $p < .05$	

* Denotes factor loading derived from factor analysis of child variables.

** Denotes factor loading derived from factor analysis of teacher variables.

3. Cerebral Palsy vs. Spina Bifida

In the classroom there emerged both an exaggeration and a refinement of the response pattern found when comparing cerebral palsy and non-brain injured children. For example, while the spina bifida children made more responses than the cerebral palsy children, the latter group emitted a greater proportion of non-verbal responses while the children with spina bifida emitted more verbal responses. This non-verbal (cerebral palsy) - verbal (spina bifida) differentiation was also apparent when work responses were examined. Spina bifida children not only requested recognition for their accomplishments more frequently, but they made more initiating responses in general. Probably, as a consequence of their evoking nature, the spina bifida children worked more with the teacher while the cerebral palsy children worked more alone. As would be expected, this pattern was maintained when non work responses were examined.

These distinctive behaviors on the part of the two groups of children were paralleled by differential teacher responses. Thus the children with spina bifida received a greater proportion of instructional interventions than the cerebral palsy children. The teachers also instructed spina bifida children with frequent presentation of materials in order to elicit purposeful work behavior. Conversely, cerebral palsy children were given less instruction and a greater proportion of preparational interventions. These findings led to the hypothesis that it would be educationally beneficial if cerebral palsy children were put in classroom situations most frequently with other cerebral palsy children and least frequently with spina bifida children. It was not as important, however, with whom spina bifida children were placed because it appeared that in a competing situation the cerebral palsy children would lose out by getting more preparational responses from the teacher while the spina bifida child was getting more instruction. In order to test this hypothesis, the 5 protocols of each of the 55 children in this study were examined in order to determine who the other children were in the classroom. Cerebral palsy children were most often placed with other cerebral palsy children (51%) and least likely to be placed with spina bifida children (5%). Children with other diagnoses comprised the remaining 44%. The placement of the spina bifida children was more evenly represented. Thus, they were placed with spina bifida children 43% of the time, cerebral palsy children 26% of the time and children with other diagnoses 31% of the time. This difference in the types of children in each of the settings was highly significant ($\chi^2=40.45$, $p < .001$). It thus appeared that the teachers in our setting were aware of the stylistic differences between these two groups of children and arranged their classroom schedule accordingly. It should be noted that this difference was observable in part as a function of the uniqueness of this setting. Spina bifida children may not be as well represented in other centers. However, these findings might aid in creating a meaningful distribution of interventions when the two groups of children must be grouped together.

These findings take on added significance because the differential

response styles which were uncovered were independent of mental age. Difference in styles emerged even when competence was equivalent. Examination of the variables which separated the groups revealed that the majority were components of factors 1 (work and non work) and 3 (assertion, peer interaction) which emerged from the factor analysis of the child classroom variables. It was therefore hypothesized that the factor scores would differentiate the groups as well. The controls ($p < .05$) and spina bifida ($p < .01$) children were better represented on factor 3 than cerebral palsy children. Thus both of these groups were more assertive, responded more creatively and were more actively social than the cerebral palsy children. Furthermore the factor scores of the cerebral palsy and controls also differed on factor 1 (work and non work - $p < .05$). While the means of the two groups were similar, their signs were opposite. This confirmed the differential styles of the two groups. The non-brain injured controls were more work oriented while the cerebral palsy children exhibited more non work.

It is of interest to note that response style on the Stanford Binet did not make a significant differentiation among diagnostic groups of children. It is possible that both the rigorous matching of subjects and the more stringent conditions of the evaluation did not provide opportunity for differences to emerge.

An Inadvertent Finding: Sex Differences in Cerebral Palsy Children

An unexpected pattern of behaviors relating to sex differences emerged during analysis of the data. These differences were not strong for the total sample, but were characteristic of the cerebral palsied children ($N=26$).

On the psychological examination although the sexes were alike on formal Stanford Binet scores, differences were found in styles of response to failure situations. For example, boys often tended to give no response to difficult items ($p < .05$). On the two educational toys, the form discrimination task appeared to be a better differentiator between the sexes than the size discrimination task, Montessori cylinders. On the form box boys demonstrated more severe errors, (higher form error score, $p < .05$ and more lid responses, $p < .01$) than the girls.

In the classroom more pervasive differences were found. When the frequency of both teacher and child behavior were examined in the cerebral palsy children, it was found that the boys worked more ($p < .05$) while the girls were more social ($p < .05$). Furthermore, the males received more frequent teacher interventions of an instructional, preparational and social nature than the girls ($p < .01$). When the way in which the teacher and child responses were apportioned was examined, not all of these differences were maintained. Thus, it appeared that although the teachers gave the boys more interventions,

they did not receive differential patterns of treatment. The children appeared to differ most in style of non-work. For example, the predominant modes of non-work in the girls were negation ($p < .10$) and passive ($p < .05$) while the boys exhibited more substitution ($p < .10$). The teachers responded differentially to these distinctive non-work styles of the boys and girls. The boys received more positive reinforcement ($p < .05$) and eliciting a response ($p < .05$) while the girls received more negative reinforcement ($p < .10$).

These results were indeed complex. The girls in this group appeared to manifest the sex role stereotype commonly assigned to young females. That is, they were more social and passive than the boys. The boys, on the other hand, worked more and received a greater quantity of teacher interventions than the girls. It remains questionable whether the boys worked more as a result of having received greater interventions. This description does not fit the hyperkinetic behavior pattern commonly ascribed to a group of brain injured boys. The difference in behavior is interesting because the extreme representation of social and passive behaviors in the girls is the exact opposite of the syndrome of hyperactivity which is frequently described in the literature and more commonly represented in boys.

Despite the findings on the sex differences, and the known heterogeneity of any sample of cerebral palsied children, it was decided to examine the sample more thoroughly by using factor analyses. This was prompted in part by the fact that the data indicated that the girls generally came from higher social strata and had a higher incidence of upper extremity involvement compared with the boys.

A basis was sought for defining any consistent patterns of variability in the cerebral palsy group. The problem, however, was that there was no way to control the demographic factors which each child brought to the situation. Among the potential descriptors for a typology of cerebral palsy children were: sex, upper extremity involvement, socioeconomic status, chronological age, mental age and speech. These descriptors were subjected to a factor analysis, not for the purpose of data reduction as is commonly the requirement for factor analysis, but rather to define any combination of variables that potentially might sort the children into separate groups. The solution of the factor analysis revealed a perfect independence between competency factors, i.e., mental age, chronological age and speech and child-specific factors such as sex, socioeconomic status and involvement of upper extremities. These latter three were themselves closely intertwined since almost all girls had upper involvement and were of higher socioeconomic status.

In order to further explicate this analysis the two factor scores of each child were plotted against each other (one factor along each axis). A four quadrant scatter plot was thus obtained. Examination of the children who fell into each of the four ($++$, $-+$, $--$, $+-$) quadrants indicated that the group

was being divided in half on the basis of sex, socioeconomic status, and upper extremity involvement. These divisions were then further subdivided on the basis of mental age and chronological age (Table 12).

The names of the four groups of children were submitted to a clinical examiner who knew the children well. She was asked to indicate classroom items which would distinguish the groups of children without defining the basis of the grouping of the children. The following were selected: 18 child variables (evaluation: non verbal responses, non verbal work, sum work, negation, substitution, request aid, competence, passive, non verbal non work and sum non work; classroom: non verbal child responses, independent work, negation, substitution, request aid, passive, sum non work and social looking) and 7 teacher variables (non verbal teacher interventions, sum preparational, sum control, sum miscellaneous, information, show and assist). Examination of the data revealed that criteria could be established which for any variable distinguished one of the four groups from the other three. Seventeen of the 25 variables ($p < .05$) so defined were statistically significant (Table 13).

The possibility was explored that each of the foregoing variables might potentially define a group on differential basis so that combined consideration of the data might yield better discrimination than any one variable examined alone. To assess this conjecture, the criteria previously established for each variable were examined for each subject simultaneously. A plus was assigned when a subject met appropriate criteria for group definition of a given variable and a minus was assigned when the criteria was not met. The inverse was also true, in that a plus was assigned when by definition a subject was supposed to fall outside of the limits of the criteria and a minus was assigned when a subject met a criteria on a variable which did not define his group. Twenty-one of the twenty-six subjects were correctly defined on at least 18 of the variables. This resulted in a highly statistically significant ($p < .002$) screening efficiency of 81%. In order to check the validity of this subtyping, the correlates of each of the variables in the original factor analysis were examined. It was found that no single variable could account for these differences. This analysis indicated that on the basis of specified demographic data typologies of cerebral palsy children can be elaborated which define the children's behavior in the classroom and the evaluation and the teacher's behavior in the class. The data also suggested that: (a) mental competence was independent of the other variables in this particular sample, and (b) sex was so closely related to upper extremity involvement and higher socioeconomic status, that it would be premature to rule out these factors as explanations.

This same analytic procedure was carried out on the remaining 29 non-cerebral palsy children. It was not as successful because of the heterogeneity of the subjects in the group.

Varying Pupil-Teacher Ratios

Examination of Table 14 indicates that pupil-teacher ratio plays a strong role in what happens in the classroom. The strength of ratio is

Table 12
 Characteristics of the Children in
 Four Cerebral Palsy Subgroups

Characteristic	I (++, N=5)	II (-+, N=7)	III (--, N=8)	IV (+-, N=6)
Mental Age (median)	28	63	38	24
Chronological Age (median)	53	70	69	38
I Q (median)	53	92	52	68
Sex: Male	0	2	6	5
Female	5	5	2	1
Socioeconomic Status:				
High	4	6	1	1
Low	1	1	7	5
Speech: Intelligible	2	7	7	4
Unintelligible	3	0	1	2
Uppers Involved: Yes	5	7	4	1
No	0	0	4	5

Table 13
Differential Patterns of Child and Teacher
Response in Four Cerebral Palsy Subgroups

	I (++, N=5)	II (-+, N=7)	III (--, N=8)	IV (+-, N=6)
<u>Child in Evaluation</u>	High Non-Verbal Resp.*** High Non-Verbal Work*** High Req. Aid. (NS) Low Competence**	Low Non-Verbal Resp.*** Low Non-Verbal Work*** High Sum Work** Low Substitution** High Competence*** Low Non-Verbal Non-Work** Low Sum Non-Work**	High Passive**	Low Passive (NS)
<u>Child in Classroom</u>	High Non-Verbal Resp.** Low Independent Work (NS) Low Negation* High Passive (NS)	Low Substitution (NS) Low Social Look. (NS)	Low Sum Non-Work* Low Passive (NS) Low Social Look. (NS)	High Substitution (NS) Low Passive (NS)
<u>Teacher in Classroom</u>	Low Verbal Intervention** Low Miscellaneous (NS) High Assist***	High Verbal Intervention (NS) High Preparation (NS) Low Show**	Low Preparation (NS)	High Controlling (NS) Low Miscellaneous (NS)

* p < .10
** p < .05
*** p < .01

Table 14
Correlates of Ratio in the Classroom

<u>Child Variables</u>	<u>Freq.</u>	<u>%</u>
Request Materials	.32*	.40**
Independent Work	.36**	.58**
Work with Teacher	-.63**	-.58**
Social Looking	.32*	-
Non Verbal Social	.27*	-
Sum Social	.30*	.34*
Peer Interaction	.35**	.34*
Substitution	-	-.29*
<u>Teacher Variables</u>		
Sum Teacher Interv.	-.70**	-
Non Verbal Teacher Interv.	-.58**	-
Verbal Teacher Interv.	-.61**	-
Sum Instructional	-.63**	-.34*
Non Verbal Instructional	-.44**	-
Verbal Instructional	-.60**	-
Show	-.41**	-
Elicit A Response	-.48**	-
Presents	-.49**	-.28*
Information Giving	-.54**	-
Sum Preparational	-	-.51**
Non Verbal Prep.	-.30*	-.27*
Verbal Prep.	-	-.27*
Sum Feedback	-.57**	-
Positive Reinf.	-.58**	-
Negative Reinf.	-.27*	-
Sum Miscellaneous	-.49**	-
Non Verbal Misc.	-.41**	-
Verbal Misc.	-.38**	-
Sum Social	-.27*	-

Note: Only those correlation coefficients which are significant are reported.

* $p < .05$

** $p < .01$

indicated by the fact that of 51 classroom variables (25 teacher and 26 child) pupil-teacher ratio significantly correlated with 28. Of these, 20 were teacher variables and 8 were child variables. This difference in representation was highly significant ($\chi^2=9.82$, $p < .001$), and indicated that teacher behaviors were more affected by ratio than child behaviors. The effect of pupil-teacher ratio was seen more clearly in the frequency of occurrence of teacher and child variables, than in terms of the breakdown of these data into percents. This indicated that ratio affected how often an event took place, although the proportional distribution of these events remained the same under high and low ratio conditions.

Closer inspection revealed that with increasing pupil-teacher ratio the teacher apportioned more of her interventions in preparational activities and decreased that portion of her activities which were instructional. Similarly in a larger class size the child was more likely to spend his time in social activities and working independently as opposed to working with the teacher.

Ratio and Teacher and Child Responses

These findings led to further investigation of the effects of high and low pupil-teacher ratio. Examination of each of the five sessions of all 55 children revealed that there were 35 children who during their period of observation were in at least one session which was a high ratio and at least one session which was a low ratio. A high ratio session was defined as any situation in which the pupil-teacher ratio was 4:2 or greater (e.g., 5:2, 6:2, etc.). A low ratio session was defined as one in which the pupil-teacher ratio was 4:3 or less (e.g., 1:1, 3:2, etc.). The data from a high and a low ratio session for each of the 35 children were compared. When there was more than one (high or low) session to choose from, a session was randomly selected. As may be seen from Table 15, results of this analysis confirmed the correlational analysis in the following ways: In low ratio settings there emerged a picture of a child engaged in activities which were congruent with work with teacher, more teacher interventions and as a result more instructional interventions. For example, the overall amount of work increased when the children were in a low ratio. This was more apparent in the verbal domain because not only was there an increase in verbal work responses, but there was also an increase in verbal child responses.

The picture of these same children in a high ratio situation was quite different. The data were congruent with fewer teacher interventions, less instruction and more preparation. The teacher managed the high ratio situation differently by providing type II tasks more frequently. These type II tasks, such as sand play or water play, or finger painting, were non-structured. They usually required an initial more elaborate preparation of the child for the activity but could then be followed by a reduction in teacher interventions. The children when

Table 15
Effect of Ratio on Child and Teacher
Classroom Response Style

<u>Child</u>			<u>Teacher</u>		
Variable	Freq. t	% t	Variable	Freq. t	% t
<u>High Ratio</u>					
Type II Task	2.69*	-	Control	2.17*	2.71**
Non Verbal Child Responses	2.19*	2.09*	Preparation	-	2.35*
Independent Work	-	3.50**			
Social Looking	4.36**	2.47*			
Other Social	2.29*	-			
Verbal Social	2.25*	-			
Non-Verbal Social	3.69**	2.40*			
Sum Social	3.30**	4.09**			
Evoke	2.25*	2.13*			
<u>Low Ratio</u>					
Work/Teacher	4.19**	3.50**	Verbal Teacher Interventions	4.32**	-
Verbal Work	2.26*	-	Non Verbal Teacher Interventions	4.35**	-
Sum Work	2.39*	4.73**	Sum Teacher Interventions	5.35**	-
			Verbal Instructional	4.49**	-
			Non-Verbal Instr.	3.40**	-
			Sum Instructional	4.53**	-
			Role play	2.52*	-
			Information Giving	2.85**	-
			Sum Feedback	3.11**	-
			Pos. Reinf.	2.93**	-
			Neg. Reinf.	2.13*	-
			Elicit Response	3.28**	-
			Present	2.19*	-
			Show	2.09*	-

* p < .05

**p < .01

placed in a high ratio not only worked more independently but also engaged in social activities primarily of a social looking nature. Children also showed more evoking behavior because the teacher was not with the child in many instances. When class size was increased, the teacher was not able to work as closely with each individual child and thus may also have needed to use controlling interventions. It is important to point out that the manner in which the teacher apportions her time does not differentiate high and low ratio settings. However, in a low ratio environment, the teacher gives more definitive instruction per child. In the child's case, however, not only does the frequency of events change but also the pattern of behaviors is altered. For example, verbal child responses, work with teacher and a greater preponderance of work responses are consonant with a low ratio situation. In contrast non-verbal child responses, independent work, social and evoking behavior are more commonly found in high ratio settings.

Ratio and Mental Age

In order to further study the differential effects of varying pupil-teacher ratio, one group of 35 children was subdivided into a group of 12 children with mental ages above 47 and a group of 23 children with mental ages below 45. These data were then subjected to the following analyses: (a) high mental age in high and low ratio settings: Differential class size appeared to have little effect on this group of children. Thus, none of the child behaviors were altered and the only teacher behavior which shifted was non verbal instruction. These high mental age children received more non verbal teaching in a high ratio environment than in a low ratio environment ($t=3.47$; $p<.01$). (b) low mental age in high and low ratio settings: Both the child and teacher behaviors of this group of children were affected by class size. In a high ratio situation the children exhibited more non-work ($t=2.21$; $p<.05$), social ($t=3.17$; $p<.01$) and evoking ($t=2.38$; $p<.05$) behaviors. In contrast, these same children exhibited more work responses ($t=4.21$, $p<.01$) in the low ratio setting. The teacher differentially varied her behaviors as well with this group of children. In the low ratio environment she did less preparation ($t=2.72$; $p<.05$) and more instruction ($t=3.66$, $p<.01$), role playing ($t=2.28$; $p<.05$) and positive ($t=3.06$; $p<.01$) and negative feedback ($t=2.60$; $p<.05$). (c) When mental age as opposed to ratio was the dependent variable it was found that in a large class both high and low mental age children responded similarly and were not differentially treated by the teacher. The reverse was found when these same children were compared in a low ratio environment. In this situation the two groups were given different styles of teaching. The low mental age group received more instructional interventions ($t=3.32$; $p<.01$) while the high mental age group received more preparational interventions ($t=2.04$; $p<.05$).

This analysis therefore indicated that the effects of pupil-teacher ratio were not uniform. While ratio had no bearing on either the teacher's or child's response style in the case of high mental age children, the picture with low mental age children was the opposite. These children

clearly profited from a low ratio situation. Not only did they receive more instruction (relative to what they received in a high ratio as well as to what high mental age children received in a low ratio) but they also exhibited more purposeful work behavior and less non work.

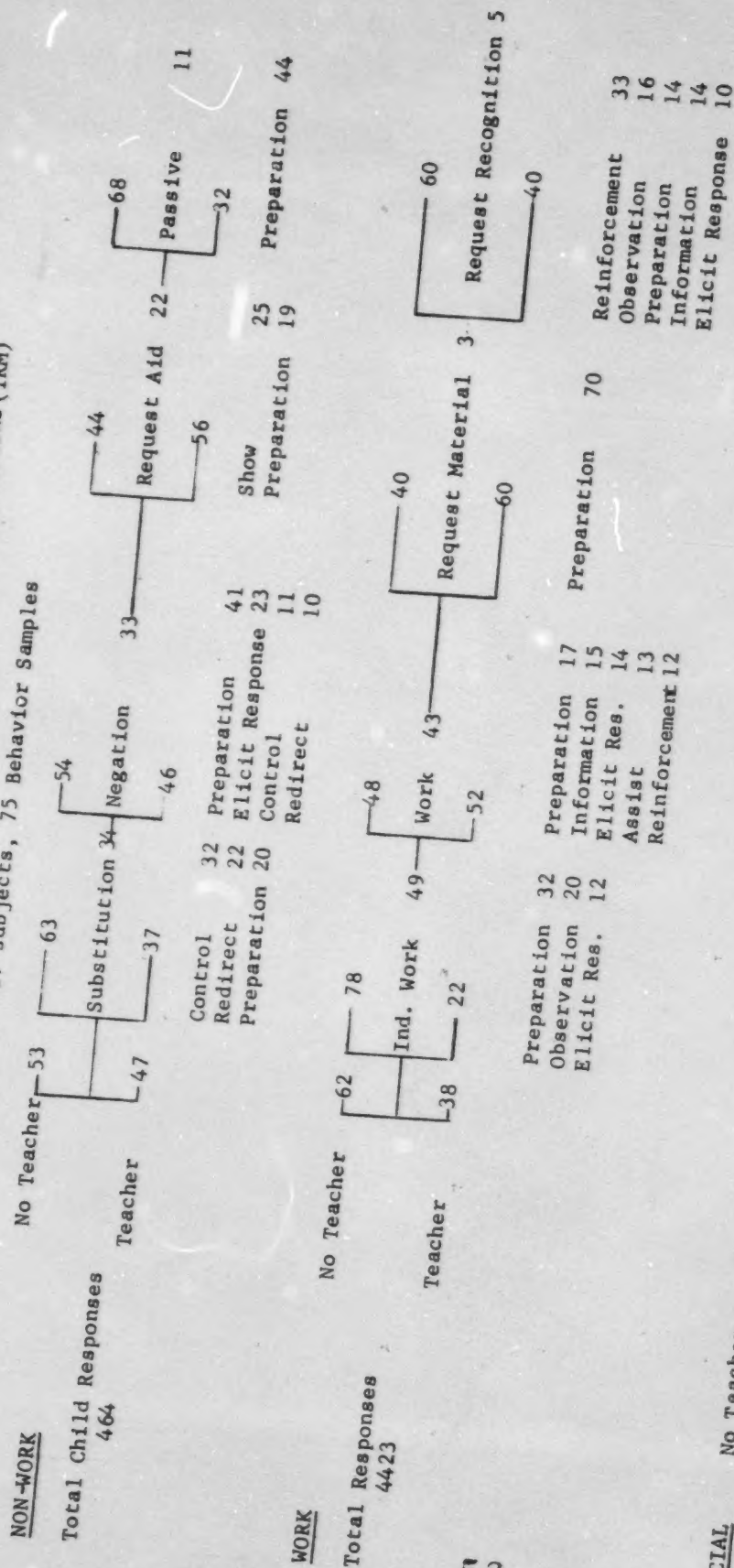
Pupil-Teacher Interaction Analysis: Model of Instruction

A model of instruction which depicted the initial sequence of interaction between teacher and child was an outgrowth of this study. This pupil-teacher interaction model was formulated through a series of discussions based on clinical judgments of the possible dyadic relationships that might occur in classrooms. This initial empirical model of pupil-teacher interaction was then tested on fourteen classroom protocols and revised to include only those interactions that appeared frequently in the classroom. This revised model included 47 combinations of pupil-teacher interactions selected from the matrix of 160 possible classroom interactions.

Analysis according to this model of instruction was performed in seventy-five classroom behavior samples for thirty-seven children who varied in chronological age, mental age, diagnosis and pupil-teacher ratio. All non work responses of substitution, negation, request aid and passive were classified according to whether or not they received a teacher intervention, and if so, what was the quality of this intervention. The results of this interactional analysis are reported in Figure 1. As can be seen, a total of 464 non work responses were exhibited by those children. Substitution and negation were the most frequently occurring non work responses, contributing about two-thirds of the total non work. Request aid and passive responses occurred less often. In general 47% of the child's non work responses in the classroom received a teacher intervention. However, non work responses of a request aid nature were responded to 56% of the time, while substitution and passive responses received a teacher intervention only 37% and 32% of the time, respectively. It appeared that the child who made the active response of requesting aid was significantly more likely to receive a teacher intervention than the child who engaged in substitutive behavior ($\chi^2=6.51$; $p < .02$) or sat passively ($\chi^2=10.73$; $p < .01$).

The type of teacher's intervention following these styles of non work behavior was also examined in order to determine if teachers intervened differently with different types of non work. These results indicated that substitution responses by the child were most frequently answered by teacher interventions in the control, redirect or preparational categories, while negation responses most often received preparational interventions. These findings suggested that the teacher more frequently responded directly to substitutive behavior by controlling the child or refocusing his attention back to the task. However, when the child exhibited negative behavior, the teacher often responded indirectly by manipulating the environment with a preparational intervention. The differences between the patterns of teacher responses elicited by substitution and negation were significant, ($\chi^2=20.40$; $p < .001$).

Figure 1
Percent Child Responses and Initial Teacher Interventions (IRM)
N = 37 subjects, 75 Behavior Samples



Similarly a teacher responded differently to children who were passive and requested aid, behaviors which are extremes. If the child actively requested aid, she may have responded with an instructional intervention of showing or less frequently with a preparational intervention ($\chi^2=13.35$; $p < .001$).

The child's work responses were also examined to determine when the teacher responded to work behavior. As can be seen in Figure 1, a total of 4423 work responses were exhibited by the thirty-seven subjects, as compared to only 464 non work responses. As was expected, the teacher intervened less frequently to work behavior. Thirty-eight percent of the children's total work responses received a teacher intervention, as compared to 47% of non work responses.

About half of the child's total work responses were independent in nature, and were not likely to receive a teacher intervention. The child's work responses with the teacher occurred 43% of the time and received an additional teacher intervention that sustained the interaction 52% of the time. As would be expected, a child working with the teacher was more likely to receive an intervention than the child who was working alone ($\chi^2=18.04$; $p < .001$). The quality of these teacher interventions was either preparational or instructional. Furthermore, the child was nearly twice as likely to get an instructional intervention as opposed to a preparational intervention when working with the teacher than when working alone. ($\chi^2=10.40$; $p < .01$).

Child responses of requesting materials or recognition were relatively infrequent in the classroom. Requests for materials were answered 60% of the time, usually with a preparational intervention. Requests for recognition received a teacher intervention 40% of the time, which were often reinforcements but also fell in the categories of observe, preparation or instruction. Children requesting material were more likely to receive a preparational intervention while children requesting recognition were more likely to receive some other form of teacher intervention. ($\chi^2=62.01$; $p < .001$).

The child's social responses were analyzed in the same way. Figure 1 indicates that 830 social responses occurred in the classroom. Only twenty-four percent of these responses received a teacher intervention, indicating the teacher was less likely to respond to social behavior than to either work ($\chi^2=10.57$; $p < .01$) or non work ($\chi^2=3.95$; $p < .05$). The teacher interventions following social responses were most often preparational, but sometimes fell in the categories of social or elicit a response.

Two Tests of Validity of the Model of Instruction

a) Comparison with Another **Preschool** Setting

In order to determine the generalizability of both the methodology

and the findings, it was decided that data should be gathered from another pre-school setting for physically handicapped brain injured children. Observations from another setting were made in three separate classrooms, one for three year olds, one for four year olds, and one for children five and six years old. Pupil-teacher ratios in these classrooms ranged from a high of 8:2 to a low of 5:3 during the period of data collection. Using the method of the present study, ten-minute samples of behavior were recorded from a one-way vision room. Twenty-four separate behavior protocols of twenty different children were collected.

The specific purposes of this part of the investigation were as follows: a) To determine whether the system of methodology for observing pupil-teacher interaction is a suitable technique that can be extended to a different classroom setting. b) To determine whether the proposed model of instruction is sufficiently inherent to teaching style as to depict pupil-teacher interaction in another classroom, and if not, whether differences in the model are relevant to differences between the classroom settings.

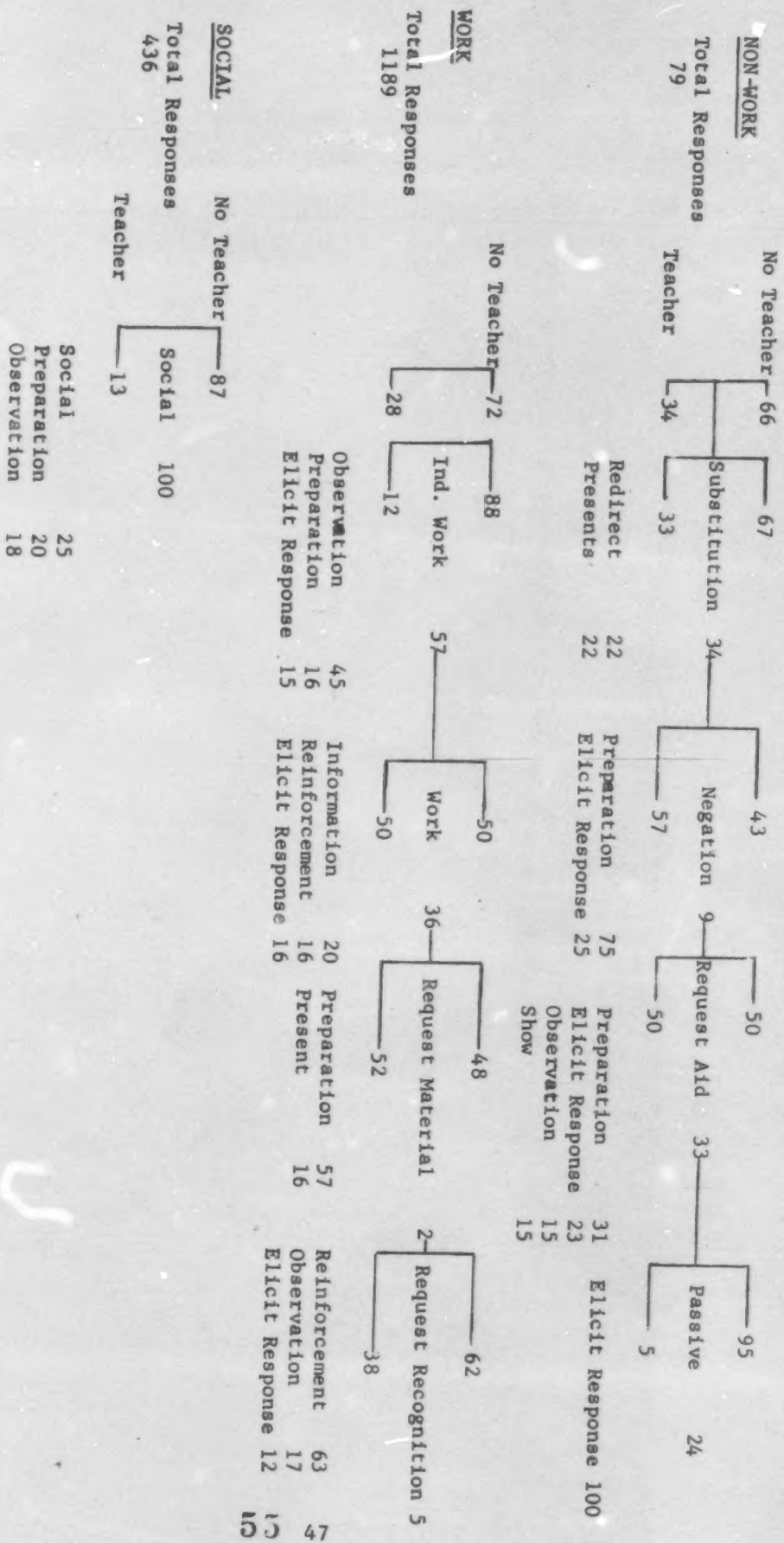
The results of one 10-minute behavior sample for twenty children suggested that the methodology for observing pupil-teacher interaction is a useful technique that can be applied to another classroom setting. The data were analyzed according to the proposed model of instruction which depicted the sequence of interaction between a child and a teacher's initial intervention. The results indicated that the percentage of hit rates, that is, pupil-teacher interactions that adhered to those depicted in the model, ranged from 75% to 100% with a median of 84%. The percentage of hit rates for the data collected at the Institute of Rehabilitation Medicine ranged from 63% to 100% with a median of 94%. It, therefore, appears that the proposed model of instruction was sufficiently inherent to teaching style as to depict pupil-teacher interaction in another classroom setting.

The data were further analyzed to determine whether the methodology was sensitive to variation between classroom settings. Children's responses of non work, work and social were examined in the same way as the data of the present study to determine when and how the teacher initially intervened. The results of this analysis are presented in Figure 2. As can be seen, the two settings were quite similar both in terms of when the teacher intervened and the quality of interventions. Although the teachers in the second setting generally intervened less often, the trend of non work behavior receiving the most teacher interventions and social behavior the fewest was similar to that found in the data of the present study. Furthermore, all chi-squares reported in the previous section were performed on this set of data and the same results were found.

Although the two classroom settings generally resembled each other for the major dimensions of child responses and teaching style both in terms of qualitative and quantitative analysis, certain stylistic differences were noted. For example, in the area of non work, the

Figure 2
Percent Child Responses and Initial Teacher Interventions for Second Setting (UCP)

N = 20 subjects, 20 Behavior Samples



children in the first setting (IRM) exhibited significantly more negative behavior, while the children in the second setting made more passive responses ($\chi^2=15.45$; $p<.001$). This finding may have been related to certain differences in the two populations and the physical settings. The children in the present study may have displayed negative behavior in reaction to the stresses of an in-patient hospital stay, while the passive responses of the children in the second setting may have been related to the fact that the predominant diagnosis was cerebral palsy.

Stylistic differences in teaching style were also noted. The teachers in the first setting (IRM) were more likely to intervene to a child's independent work response with a preparational intervention, while teachers in the second setting more often observed independent work ($\chi^2=12.91$; $p<.001$). This difference may have been due to the higher pupil-teacher ratio in the second setting, as well as the differential goals of the teachers in the two settings.

Social behavior by the child also yielded differences in teachers' interventions. The teachers in the first setting (IRM) usually responded to social behavior with a preparational intervention. However, in the second setting, a child's social behavior received a teacher intervention which was social ($\chi^2=4.68$; $p<.05$). It is possible that teachers in the first setting prepared the child to get him back to the task, while teachers in the second setting encouraged the social interaction. Teaching style also differed in regard to the child's requests for aid. In the first setting (IRM) a child's request for aid usually brought an instructional intervention of show, while in the second setting, requests for aid were met with with preparational interventions ($\chi^2=4.40$; $p<.05$).

Although these differences in teaching style were tentative due to the possibility of errors of measurement in the second setting they did suggest that the current methodology is sensitive to variations in teaching style, and that the model of the classroom instruction captures differences as well as similarities between classroom settings.

b) Pupil-Teacher Interaction According to Flanders

In order to get a more comprehensive view of pupil-teacher interaction in the classroom and to further test the validity of the model of instruction, another interaction analysis was undertaken. All responses and interventions which occurred in a particular classroom protocol were listed sequentially, in order of occurrence. This was done for every child in every classroom session, yielding a total of 275 episodes.

All responses and interventions were then tabulated, in pairs, onto a matrix according to an interaction analysis method developed by Flanders (1970). The method was modified for the present analysis and the tabulation was performed in the following manner. A matrix consisting of 676 (26 by 26) possible combinations of responses and interventions was made in which all possible responses and interventions were lined up along each axis.

Responses and interventions were sequentially paired and a tally mark was made in the appropriate box of the matrix for each such pair. The first response of a pair was measured along the Y-axis of the matrix and the second response along the X-axis. The second response of the first pair then became the first response of the second pair and so on. In essence, then, all responses and/or interventions, except for the first and last of a particular behavior sample, were used twice, first as a second response and then as a first response.

An interaction analysis matrix was developed for each child, and thereafter one grand matrix was compiled from the 55 individual matrices. It contained 33,830 paired responses, 14,125 for the child and 19,705 for the teachers.

The grand matrix was then subdivided into four quadrants, hereafter referred to as C-C, C-T, T-C, and T-T, according to the identity of the participants in the interaction.

Figures 3 and 4 present bar graphs which represent child and teacher behaviors in proportion to their frequency of occurrence in the four quadrants. These data indicate that the distribution of teacher behaviors was more stable than that of child behaviors. Thus the child's behaviors were significantly altered by the presence or the absence of the teacher. This analysis suggested that the child's behaviors were more influenced by the teacher's presence than were teacher behaviors influenced by the child's presence.

In the next phase of this analysis expected frequencies for each cell in the C-T and T-C matrices were determined. A percentage change score was then derived for each cell which represented deviations from expected frequencies. Of the 96 cells on which this analysis was performed, under a null hypothesis of no association between teacher and child responses, significant increments were found in 22. These shifts beyond expectation are depicted in Figure 5. Initial inspection of this figure revealed its similarity to the model of instruction presented earlier. Thus this complicated analytic procedure validated the previous findings. This analysis also added the following information: (1) It defined a model of interactions with a limited number of possible behavioral responses for teacher and child. Thus from the teacher's standpoint this model might be used to illuminate differential priorities of teacher activities which may be selected as appropriate responses to given child activities. (2) This analysis also clarified the factor analysis of the teacher variables in the classroom. Inspection of Figure 5 indicated that the teacher emitted responses which loaded on factors 1 and 2 when she was instructing. This loading on two factors suggested the diverse nature of classroom instruction. The verbal or non verbal quality of her instruction was probably dependent upon variables previously discussed such as mental age, response style, disability and temperament. In contrast to this, when the teacher was dealing with the child's behaviors of non work or requesting, her responses loaded only on factor 2. This indicated that her intent was more uniform when the child was not working, and that her interventions were focused on directing the child back to purposeful work.

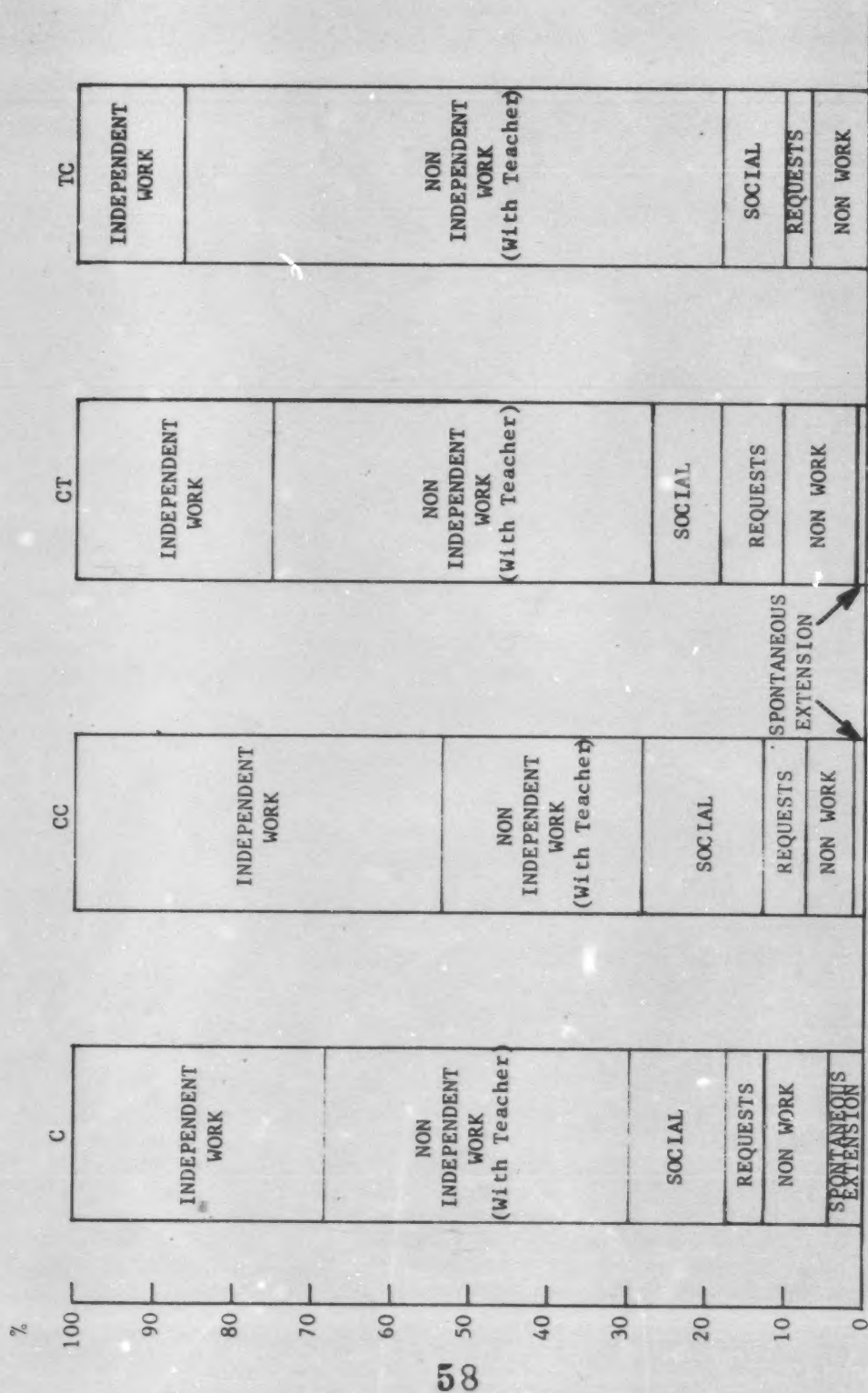
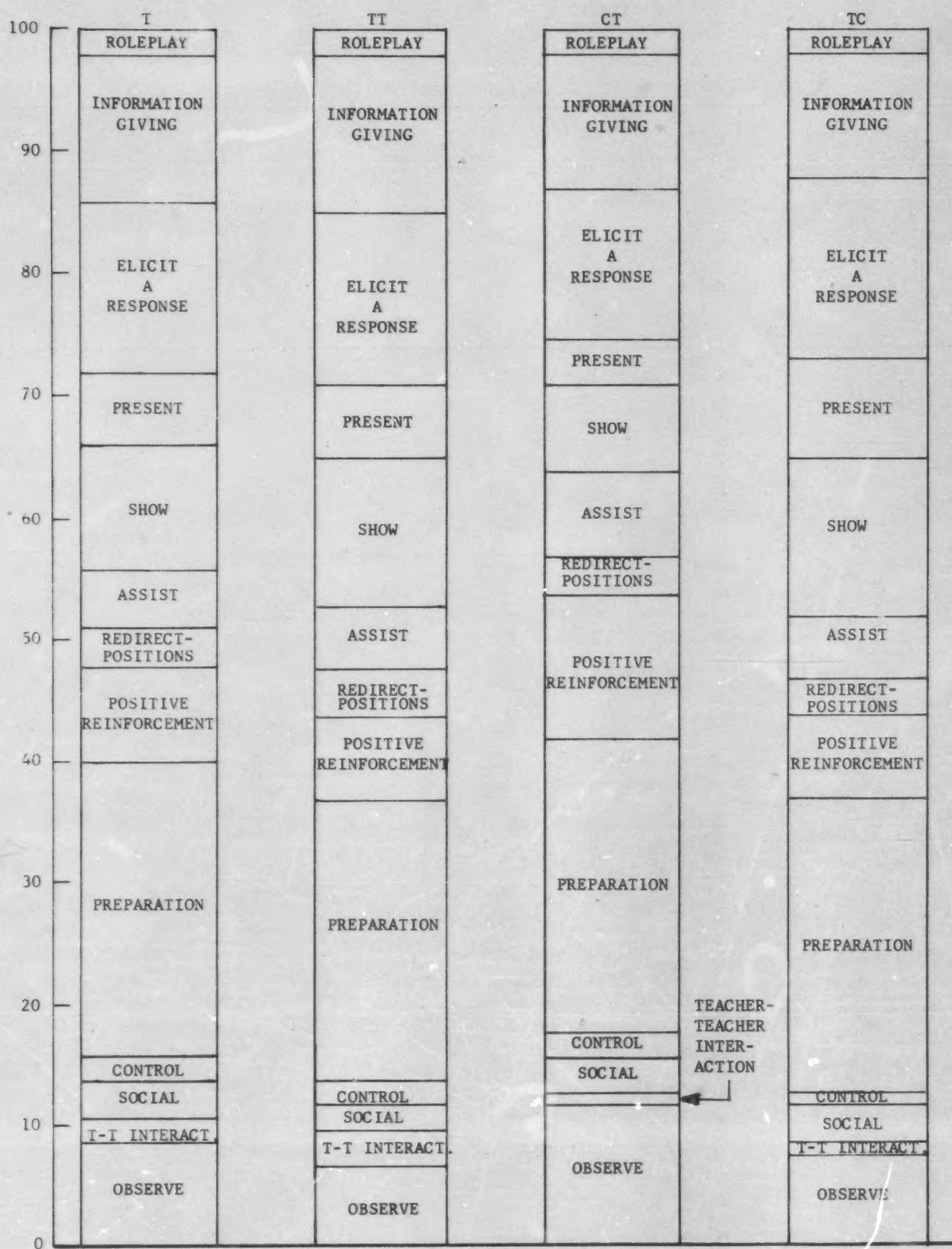


Fig. 3 Proportionality of Child Behavior

Fig. 4 Proportionality of Teacher Behavior



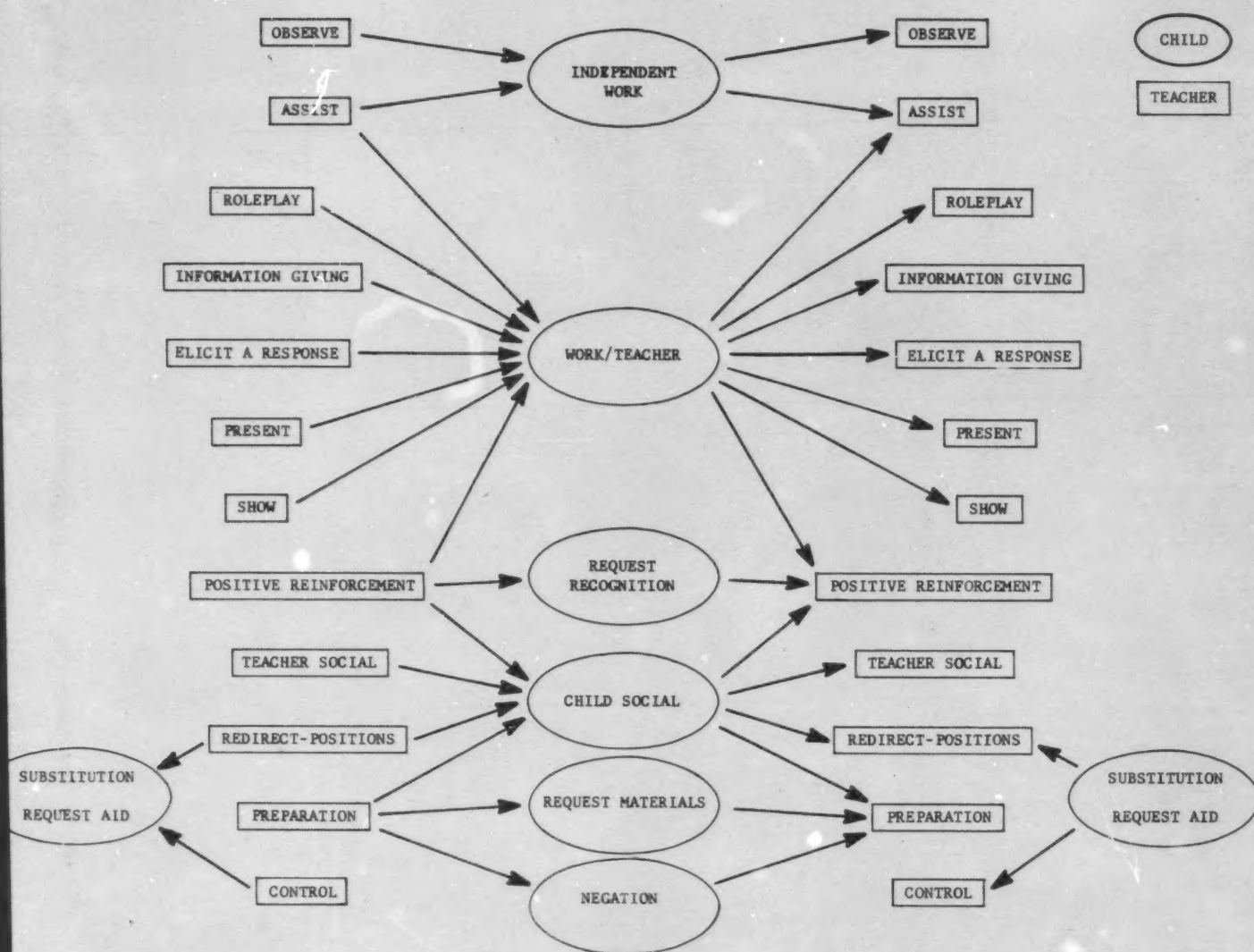


Fig. 5 A Model of Priority of Teacher Interventions to Multiple Child Behaviors

A Long-Term Follow-Up Observation of Two Subjects

Follow-up observations of pupil-teacher interaction in the classroom were made on 23 children. These 5 ten minute samples for each child were made during the fourth week of the child's preschool program. The results of correlational analysis of the follow-up sessions were compared to the initial session to determine whether there were any changes in the classroom after one month. The findings revealed a similar pattern of pupil-teacher interaction for the initial and follow-up sessions (t tests for correlated samples were not significant for any of the variables which included 26 child variables and 25 teacher variables). Clinical interpretation of these findings suggested that one month may have been too short a time to reflect change.

Because two of the subjects participated in the nursery school program for a period of 14 months and 21 months, these children were studied as long-term follow-up cases. The purpose of this investigation was twofold: 1) To further study evaluation parameters to determine what changes occurred over time in competence and style. 2) To explore diagnostic implications of evaluation data for classroom behavior and teaching style.

Table 16 reports the Initial and Follow-Up evaluation data for Richard, a non-brain injured traumatic amputee who was a control subject and George, a brain injured experimental subject. The data showed overall improvement for the two boys in both competence and style. In the case of George, his mental age increased 14 months compared to an increase of 22 months for chronological age. The gain seen for mental age was actually higher because in the initial evaluation the results were an inflated estimate because he was unable to pass all items at the II year basal age. These gains were more than might have been expected for a child with a developmental lag. In the case of Richard, mental age increased in a greater amount compared to chronological age and was more in keeping with his intellectual potential. In both cases, follow-up data were a more reliable measure. In comparing initial and follow-up data for style, both boys increased in work behavior and decreased in non work responses. Non work responses also changed qualitatively; both boys made fewer responses of substitution and negation. In the case of Richard, the lower level response of substitution was reduced to almost none while the higher level response of competence appeared. The children's responses to educational materials are also seen in Table 16. During the follow-up evaluation, on the form box and cylinders, both boys required fewer number of trials, with fewer errors and had less need for assistance. George made more dramatic improvement than Richard on the two toys despite the fact that he was the brain injured child. In addition, item analysis of the Stanford Binet revealed that George's advanced level item successes were on tasks involving form discrimination. Richard, on the other hand, showed relatively less improvement on the toys and item analysis of the Stanford Binet indicated that his first failure appeared in the area of form discrimination.

Table 16

Initial and Long Term Follow-Up Evaluation on Two Children

	Richard (Non Brain Injured) 7/71 to 9/72		George (Brain Injured) 11/70 to 9/72	
	Initial	Follow-Up	Initial	Follow-Up
Age in months	32	36	49	71
Mental Age	29	49	22	36
I.Q.	89	105	45	45
Temperament	18	10	15	9
<u>Stanford-Binet (Percents)</u>				
Work	58	93	64	84
Non-Work	42	7	36	16
Substitution	28	1	25	15
Competence	0	4	0	0
Negation	9	0	8	0
Request Aid	1	1	2	0
Passive	4	1	1	1
<u>Formbox</u>				
Number Trials	30	24	35	22
Assists	9	5	11	2
Rotations	5	5	2	8
Form errors	12	6	20	1
<u>Cylinders</u>				
Number Trials	35	24	38	24
Errors	10	14	23	11
Assists	4	0	7	0

The above characteristics may be related to the experience in training and teaching style given to each of these children. In the classroom situation, the analysis of task on George's fifteen behavior samples, revealed that he received twenty-six task changes of Type I or structured material as compared to seven Type II or unstructured materials. Richard, on the other hand, received seventeen Type II task changes and only five of Type I. In selecting type of material for each child, the teachers were responding to the dominant need of each child. Richard, who was working through an emotional adjustment to his traumatic accident, was helped through open ended and less structured material such as water play. George, who presented severe perceptual deficits related to organicity, was trained in the visual-spatial domain with structured materials. The gains by these two children, therefore, appeared in the areas in which they received specific intervention.

Other qualitative changes were also observed for both children. For example, during the initial evaluation George had a marked echolalic quality in his speech which in the follow-up data was manifested in repetitive statements. Although still characteristic of brain injury, this quality was more adaptive. In working on the toys, he helped his performance through monitoring his movements with verbalizations such as "turn it." George's temperament rating also improved, indicating increased emotional independence, better problem solving behavior, and better rapport with the examiner. In the case of Richard, qualitative changes were seen primarily in the area of emotional stability. In the earlier evaluation it was difficult to establish rapport and gain his cooperation and therefore testing took three sessions. During the follow-up evaluation, however, he related well, was cooperative and testing took only two sessions. Richard's increased emotional stability is reflected in his higher temperament rating.

Table 17 presents the classroom behavior of the two boys. Richard made more responses in his follow-up sessions and of these there was an increase in his social behavior. His verbal behavior also increased as did his work with the teacher. Over a year's time the teacher's style also changed (Table 18). More verbal interventions were given as compared to non verbal and both social and miscellaneous interventions increased. This corresponded to Richard's increase in social and evoking behaviors. In style of instructing the teachers increased their giving of information, eliciting responses and reinforcement while role playing activity decreased. Role playing was a dominant aspect in the initial sessions which was used to help Richard express the feelings associated with his traumatic experience.

In the case of George, classroom behavior showed marked signs of growth. His work behavior increased while non work and social decreased. There was also an increase in overall verbal behavior. George was less passive and less negative in the follow-up sessions. He had more work with teacher responses and teacher interventions in general were greater

Table 17

Classroom Response Style
Initial and Long-Term Follow-Up

	<u>Richard</u>				<u>George</u>			
	<u>Initial</u> Freq.	%	<u>Follow Up</u> Freq.	%	<u>Initial</u> Freq.	%	<u>Follow Up</u> Freq.	%
No. of Responses	348		417		422		417	
Work	277	(79)	306	(74)	310	(74)	377	(91)
Non Work	17	(5)	18	(4)	43	(10)	18	(4)
Social	54	(16)	93	(22)	69	(16)	22	(5)
Verbal	56	(16)	125	(30)	63	(15)	121	(29)
Non Verbal	292	(84)	292	(70)	359	(85)	296	(71)
<u>Work Subcategories</u>								
Verbal Work	49	(18)	88	(29)	49	(16)	94	(25)
Independent Work	142	(51)	109	(36)	139	(45)	136	(36)
Work/Teacher	135	(49)	197	(64)	171	(55)	241	(64)
Spontaneous Extension	3	(1)	0	(0)	0	(0)	0	(0)
<u>Non Work Subcategories</u>								
Negation	5	(29)	8	(44)	24	(56)	3	(17)
Substitution	11	(65)	3	(17)	10	(23)	6	(33)
Request Aid	1	(6)	6	(33)	2	(5)	8	(44)
Competence	0	(0)	0	(0)	0	(0)	1	(6)
Passive	0	(0)	1	(6)	7	(16)	0	(0)
Social Looking	32	(59)	42	(45)	66	(96)	9	(41)
Peer Interaction	1	(1)	44	(11)	14	(3)	0	(0)
Evoke	35	(10)	73	(18)	90	(21)	61	(15)

Table 18

Teaching Style
Initial and Long-Term Follow-Up

	Richard				George			
	Initial Freq.	%	Follow Up Freq.	%	Initial Freq.	%	Follow-Up Freq.	%
Number Interventions	266		272		223		410	
Verbal	120	(45)	149	(55)	79	(35)	263	(64)
Non Verbal	146	(55)	123	(45)	144	(65)	147	(36)
Preparational	56	(21)	36	(13)	70	(31)	27	(7)
Instructional	173	(66)	157	(58)	131	(59)	326	(79)
Controlling	5	(2)	5	(2)	7	(3)		(1)
Social	7	(3)	23	(8)	5	(2)	16	(4)
Miscellaneous	23	(8)	51	(19)	10	(5)	38	(9)
<u>Instructional</u>								
Verbal	100	(57)	112	(71)	56	(43)	232	(71)
Non Verbal	75	(43)	45	(29)	75	(57)	94	(29)
Information Giving	21	(12)	41	(26)	10	(8)	56	(17)
Role Playing	62	(36)	0	(0)	0	(0)	0	(0)
Reinforcing	12	(7)	23	(15)	7	(5)	71	(22)
Redirecting	6	(3)	3	(2)	26	(20)	16	(5)
Elicit A Response	28	(16)	48	(30)	25	(19)	102	(31)
Presenting	14	(8)	15	(10)	8	(6)	35	(11)
Showing	26	(15)	25	(16)	33	(25)	40	(12)
Assisting	6	(3)	2	(1)	22	(17)	6	(2)
Weighted Ratio*	22		16		24		15	

*Refers to the sum of children in the five sessions from which data was recorded.

for the follow-up sessions (Table 18). Corresponding to his increase in verbal behavior, the teachers gave more verbal instruction which included information giving. He was also given more reinforcement and eliciting of responses. Showing and assisting, which are more concrete styles of instruction, were reduced.

In summary, both George and Richard showed improvement in competence as well as response style in the evaluation situation. They also exhibited different styles of response in the classroom setting. Differences in teaching style were also found, suggesting that the teachers were responding to the cognitive and stylistic changes that had occurred in these children over time. These findings suggest that the observational method is sensitive to changes across time in both child response style and teaching style.

CONCLUSIONS

This study had two types of limitations: those that were related to naturalistic observation of the situation investigated and those that arose from the multiple characteristics of the children being studied.

The first set of limitations were a result of observation of the natural flow of classroom events. These observations were limited to ten minute samples of behavior during the middle part of the period which fostered visual motor development. No other controls were imposed. Thus, pupil-teacher ratio varied according to the teacher's educational plans for meeting individual children's needs, but was also strongly dependent on the number of children in the pediatric service. As a result of the naturalistic observation, the data yielded an abundance of information with a large number of variables to be examined. In contrast to the multiplicity of variables, there was a small number of subjects. It was possible to align given subgroups of subjects on selected specified sets of variables, in order to control some variance. Sample size, however, did not permit the establishment of equivalence on all relevant dimensions. Due to this lack of control, many of the findings had competing explanations.

As was indicated, this study sampled one segment of the preschool curriculum. It would be interesting to see what aspects of pupil-teacher behaviors would be altered by other areas of the curriculum such as the socialization period as well as by different educational philosophies. The findings of this study are also restricted because the major observations were limited to a single preschool setting, with only a pilot investigation in a second setting. Despite these limitations, the results are of importance because they provide answers to the questions initially posed and suggest new issues and research probes which can blend practice and research in novel ways. It further represents a methodological advancement in the development of a technique for naturalistic observation which can be useful to examine the settings.

The first issue posed pertained to the unidimensional or multidimensional aspects of cognitive functioning in young children. The results suggest that mental functioning as manifested in a psychological examination was multidimensional. Competence as defined by performance on the Stanford Binet and the two educational toys emerged as a powerful component. Mental functioning also included aspects of both cognitive and response style which were related to mental age. A second component of mental functioning which emerged from the evaluation represented both temperament and style of non work to the task demands of the Stanford Binet. It reflected a child's mode of response when faced with a difficult task.

The second issue pertained to cognitive functioning in different situations. Cognitive functioning in the evaluation was differentially related to aspects of the child's performance in the individual tutorial

session and classroom situation. Competence tapped dimensions of work style and assertive behavior while temperament and style of non work related to social behaviors. The data, therefore, have indicated that the major components of the evaluation are not dimensions of behavior which are characteristics of only a single situation.

The third issue was concerned with differences in a child's cognitive functioning and medical diagnosis. The findings indicated that children of varying medical diagnoses showed differences in response style. Distinctive patterns of response to cognitive demands, which were independent of competence, were found for the cerebral palsy, spina bifida and non-brain injured groups.

The results for different disability groups are somewhat counter to the thrust of studies which have appeared in the literature since World War II. These studies have suggested that there is nothing psychologically specific, unique or different about people in one disability category as opposed to another.

These findings have resulted in a trend toward clustering all brain injured children together and considering the "brain injured child" as a unitary phenomenon. The data from this study, however, contradict earlier findings and instead indicate that brain damage is not a unitary concept but rather multidimensional. The findings revealed different modal patterns of behavior in the cerebral palsy, spina bifida and non-brain injured groups. The difference was clearest when each of the groups was compared with the cerebral palsy sample. The spina bifida children appeared to be more assertive, work oriented and responsive, while the control children, besides being more responsive and work oriented, were more frequently creative in their use of the materials presented to them. The control children also had a more realistic picture of their own competence. However, the distinctive pattern of response found in the cerebral palsy sample was in contrast to both of these.

The cerebral palsy child most clearly stands apart from the others. The cerebral palsy child in the classroom tended to be less active, less work oriented and an observer rather than a participant in contrast with the other groups. He responded less and tended to sit passively. The cerebral palsy child also tended not to request recognition. Sometimes the teacher did not respond to this apparent passivity. This pattern of child response might be called hypoactivity. This notion of hypoactivity was validated when the video tapes of the individual tutorial session were viewed. It was apparent that the cerebral palsy children were slow in responding to materials as well as in their interaction with the teacher. This is indeed an interesting finding since most of the focus of professionals has been on the brain injured child as being over-active as opposed to under-active.

Hypoactivity in the cerebral palsy child might have consequences other than passivity in the classroom. For example, in the course of growing up the child, due to restricted movement, might fail to engage in normal interactions with objects in his environment (Shere & Kastenbaum, 1966). His social interactions might also be less frequent and intense than those of other children (Barker, 1953), due to factors such as parental overprotection and sporadic school attendance. This might result in a history of diminished and distorted interpersonal feedback (Richardson, 1964) such that the child's social development is impoverished, superficial and immature (McCavitt, Diller & Orgel, 1966). Each of these might be a consequence of diminished interaction with the environment, resulting from hypoactivity. The questions arising from this are: (1) Is hypoactivity a reliable finding? (2) Is it a phenomena that teachers may be made aware of? (3) Can it be effectively dealt with in the classroom? (4) What roles do sex and upper extremity involvement play in the emergence of this distinctive behavior pattern?

The fourth and fifth issues of this study pertained to parameters of teaching behavior in the classroom and their relationship to a child's cognitive functioning. The findings of this study point to a child's competence, cognitive style and response style as dimensions which influence teaching style. In most school settings, teachers use IQ or mental age as a descriptor of cognitive functioning to differentiate fast and slow learners. The appropriateness of this type of classification has been strongly questioned as to its relevance to school achievement. This issue is particularly pertinent for preschool handicapped children because the reliability and validity of test results for the very young and the handicapped has been questioned. The assessment of intelligence in these children is often negatively affected by developmental delay or physical disability. The delineation, in this study, of the relationship between mental age and other characteristics of the child in the evaluation and classroom broadens the educational relevance of the concept mental age. Thus, the concept of mental age has important and practical implications for classroom teaching. It is related to a) features of cognitive style, b) a child's manner of working with toys commonly used in preschool settings, c) a child's behavior in the classroom and d) a teacher's response style in the classroom.

The relevance of mental age in this sample is heightened by the observation that chronologic age appeared to be less important than competence for teaching style. In normal children there is the expectation of a near perfect correlation between mental and chronologic age. This was not the case in most of the brain injured children in this study. This indicates a dissociation of these two functions. The implication of this finding for teaching handicapped brain injured children might be that within certain limits chronologic age appears to be less salient than mental age. This suggests mental age as a more meaningful marker on which to group children into classes than chronologic age.

The results of this study indicated that a child's responses to task requests on the Stanford Binet were factorially complex and had intercorrelates which are relevant to education. Although mental age has been a widely used educational determinant, the factor structure of the evaluation parameters also revealed the importance of temperament. Response style as a reflection of temperament adds a depth previously missing in traditional psychological examination. Thus, this study indicates that there are several characteristics that should be examined during psychological evaluation, including level of mental competence, temperament and response style.

The use of psychometric tests to assess both achievement and performance style broadens the scope of psychological examination to include not only the "how well" of functioning, but also the "how" (Hertzog et al., 1968). Even when groups of children are equated for competence, they still differ in their style of performance with respect to cognitive tasks. Response style is both a corollary and the counterpart of competence. Even when mental age is a controlled factor, response style can illuminate individual differences. The notion of response style modifies the concept of deviance, for it specifies conditions under which certain behaviors may not be deviant for individual children. For example, hypoactivity is not a sign of deviance in cerebral palsy children, but an expected characteristic of these children. It is a manifestation of a stylistic difference in response to a series of cognitive demands. The origins of this stylistic difference remain unclear and are in need of further investigation. It could be a consequence of upper extremity involvement, sex or disability. It might also be a reflection of alterations in internal timing mechanisms, as has been suggested by the work of Birch (Birch & Demb, 1959; Birch, Belmont & Karp, 1965) which points toward altered responsiveness of the nervous system as a consequence of brain damage.

It was of further interest that response style did not emerge as an important factor in the individual tutorial session. Individual differences in response style, therefore, are not necessarily synonymous with unsuccessful learning. Under optimal conditions idiosyncratic response styles may be effectively dealt with by the teacher. This points toward the need for versatility in teaching style in order to optimize instruction. It also indicated the value of assessing a child's behavior in an ongoing learning situation. Naturalistic assessment seeks to shed light on the processes involved in learning and teaching.

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APPENDIX A

Demographic Characteristics of Subjects

Subjects	Chron. Age (Months)	Mental Age (Months)	I.Q.	Sex	Diagnosis	Uppers Involved	Ambulation	Socio-Eco. Status	Ethnicity	Language At Home	Speech Development
1	42	42	100	F	NBD	No	Wheelchair	Low	Mexican	Spanish	Normal
2	48	52	107	M	SB	No	Wheelchair	Low	Black Am.	English	Normal
3	40	28	70	F	CP	Yes	Wheelchair	High	French	French	Normal
4	38	24	64	M	CP	No	Wheelchair	Low	Black Am.	Spanish	Unintell.
5	31	27	86	F	NBD	No	Wheelchair	Middle	1st Gen. Am. Spanish	Spanish	Normal
6	52	51	97	M	CP	No	Wheelchair	Low	White Am.	English	Intell.
7	37	22	59	M	OBD	No	Wheelchair	Low	1st Gen. Am. Chinese	Chinese	Unintell.
8	37	28	75	M	CP	No	Wheelchair	Middle	1st Gen. Am. English	English	Normal
9	56	60	107	F	CP	Yes	Ambulatory	High	White Am.	English	Normal
10	42	44	102	F	SB	No	Wheelchair	Middle	White Am.	English	Intell.
11	80	40	45	M	OBD	No	Ambulatory	Low	White Am.	English	Normal
12	67	67	100	F	CP	Yes	Ambulatory	Middle	White Am.	English	Normal
13	63	51	79	M	OBD	No	Ambulatory	Middle	White Am.	English	Normal
14	32	29	89	M	NBD	Yes	Wheelchair	Middle	White Am.	English	Intell.
15	80	31	33	M	CP	Yes	Wheelchair	Middle	White Am.	English	Normal
16	54	36	65	F	SB	No	Wheelchair	Low	White Am.	English	Normal

NBD = No Brain Damage
 OBD = Other Brain Damage
 CP = Cerebral Palsy
 SB = Spina Bifida

APPENDIX A (cont.)

Demographic Characteristics of Subjects

Subjects	Chron. Age (Months)	Mental Age (Months)	I.Q.	Sex	Diagnosis	Uppers Involved	Ambulation	Socio-Eco. Status	Ethnicity	Language At Home	Speech Development
17	61	56	109	M	SB	No	Wheelchair	Middle	White Am.	English	Intell.
18	67	42	58	M	SB	No	Wheelchair	Pub. Assist.	White Am.	English	Normal
19	86	63	76	F	CP	Yes	Wheelchair	Low	Black Am.	English	Intell.
20	76	51	64	F	CP	Yes	Wheelchair	Pub. Assist.	1st Gen. Am.	Spanish	Normal
21	70	34	43	M	CP	Yes	Wheelchair	Pub. Assist.	White Am.	English	Normal
22	28	19	68	M	SB	No	Wheelchair	Low	1st Gen. Am.	Spanish	Unintell.
23	47	22	48	F	CP	No	Wheelchair	High	White Am.	English	No speech
24	67	58	85	M	CP	No	Wheelchair	Middle	White Am.	English	Normal
25	36	23	64	F	NBD	Yes	Ambulatory	Middle	White Am.	English	Normal
26	55	48	86	F	CP	Yes	Ambulatory	High	White Am.	English	Normal
27	32	35	105	F	SB	No	Wheelchair	High	White Am.	English	Normal
28	56	30	50	F	CP	Yes	Ambulatory	Middle	1st Gen. Am.	Turkish	No speech
29	67	28	35	M	SB	No	Wheelchair	Low	1st Gen. Am.	Italian	Unintell.
30	83	34	36	M	CP	Yes	Wheelchair	Low	White Am.	English	Intell.
31	70	65	92	F	CP	Yes	Wheelchair	High	White Am.	English	Intell.
32	49	34	68	F	OBD	Yes	Wheelchair	Low	Ecuadorian	Spanish	Normal

NBD = No Brain Damage
 OBD = Other Brain Damage
 CP = Cerebral Palsy
 SB = Spina Bifida

APPENDIX A (cont.)

Demographic Characteristics of Subjects

Subjects	Chron. Age (Months)	Mental Age (Months)	I.Q.	Sex	Diagnosis	Uppers Involved	Ambulation	Socio-Eco. Status	Ethnicity	Language At Home	Speech Development
33	62	47	75	M	OBD	No	Ambulatory	Middle	1st Gen. Am.	English	Normal
34	32	34	102	M	NBD	No	Ambulatory	Low	White Am.	English	Intell.
35	50	43	85	F	OBD	No	Ambulatory	Pub. Assist.	Black Am.	English	Unintell.
36	67	63	93	F	NBD	Yes	Ambulatory	Low	Black Am.	English	Normal
37	61	20	33	F	CP	Yes	Wheelchair	High	White Am.	English	No speech
38	62	60	96	F	NBD	No	Ambulatory	Middle	White Am.	English	Normal
39	66	44	63	F	SB	No	Wheelchair	Middle	White Am.	English	Normal
40	70	54	75	M	CP	No	Ambulatory	Low	1st Gen. Am.	Italian	Normal
41	65	45	66	M	OBD	Yes	Ambulatory	Low	1st Gen. Am.	Portuguese	Normal
42	46	41	88	F	SB	No	Wheelchair	High	White Am.	English	Normal
43	56	24	39	M	CP	Yes	Ambulatory	Pub. Assist.	1st Gen. Am.	Spanish	Unintell.
44	70	74	107	M	NBD	Yes	Ambulatory	Low	White Am.	English	Normal
45	32	23	71	M	CP	Yes	Wheelchair	Low	Black Am.	English	Intell.
46	70	72	103	M	SB	No	Wheelchair	High	White Am.	English	Normal
47	47	25	53	M	CP	No	Wheelchair	Pub. Assist.	1st Gen. Am.	Spanish	Unintell.
48	37	43	111	M	NBD	Yes	Wheelchair	High	White Am.	English	Intell.

NBD = No Brain Damage
 OBD = Other Brain Damage
 CP = Cerebral Palsy
 SB = Spina Bifida

APPENDIX A (cont.)

Demographic Characteristics of Subjects

Subjects	Chron. Age (Months)	Mental Age (Months)	I.Q.	Sex	Diagnosis	Uppers Involved	Ambulation	Socio-Eco. Status	Ethnicity	Language At Home	Speech Development
49	74	74	100	M	CP	No	Wheelchair	High	White Am.	English	Normal
50	39	21	54	M	CP	No	Wheelchair	Low	1st Gen. Am.	Spanish	Normal
51	38	40	102	M	NBD	No	Ambulatory	Low	1st Gen. Am.	Spanish	Normal
52	44	34	77	F	SB	No	Wheelchair	Middle	White Am.	English	Normal
53	60	34	52	F	CP	No	Wheelchair	Low	Black Am.	English	Normal
54	46	34	73	F	CP	No	Wheelchair	Low	Black Am.	English	Normal
55	53	29	53	F	CP	Yes	Wheelchair	Low	Black Am.	English	Normal

NBD = No Brain Damage
 OBD = Other Brain Damage
 CP = Cerebral Palsy
 SB = Spina Bifida

APPENDIX B

Summary of Evaluation

Name: Mary Ellen
 Birthdate: 11/10/65
 Age of Testing: 70 Mo.
 Date of Adm: 9/9/70
 Diagnosis: Rubella Syndrome

Birth Order: Second of three children

Occupation of head of
 household: Manager of Finance Firm

S - B I.Q. 92

M.A. 65 Mo.

Response Style		Summary				Total	
		V	NV	V	NV		
Work:	(Work Delimitation	87	62	90	62	152	Work
	(Spontaneous Extension	3	—				
Non Work:	(Negation	—	—				
	(Substitution	1	—	20	0	20	Non Work
	(Request for Aid	—	—				
	(Competence	19	—				
	(Passive	—	—				
Total				110	62	172	

Formbox: No. of Trials: 20
 Correct: 12
 Teacher Assists: 1
 Rotations: 6
 Errors: 1

Cylinders: No. of Trials: 29
 Correct: 10
 Errors: 16
 Spoils: 1
 Assists: 0
 Basket: 2

APPENDIX B (cont.)

FORM SORTING BOX

Child: Mary Ellen

Scorer: HH

Mary Ellen named the forms by color as she removed them from the box

Forms: ○ (circle), □ (square), / (rectangle),
△ (triangle),] (c-shaped)

Moves: Correct response--- ○ → ○ △ → △
Form errors----- ○ → □ / → □
Rotation errors---- △ →]
Mid responses----- L
Teacher assistance- T

Move	Type	Move	Type
1.	△ ↷	13.	/ → /
2.	△ →]	14.	/ → /
3.	△ → △	15.	] ↷
4.	△ → △	16.	] ↷
5.	△ ↷	17.	T
6.	△ → △	18.	] ↷
7.	○ → ○	19.	] ↷
8.	○ → ○	20.	] →]
9.	○ → ○		
10.	□ → □		
11.	□ → □		
12.	/ → /		

Summary of Scores:

correct	12
rotations	6
teacher	
assist	1
error	1
trials	20

APPENDIX B (cont.)

Montessori Cylinders

Child: Mary Ellen
Scorer: HH

Sample Scorings: 1-3 Cylinder 1 placed in hole #3 - incorrect
4-4T Teacher assistance given
5-5 Cylinder 5 placed in hole #5 - correct
5-B Cylinder 5 replaced in basket

Move	Type	Score (Error Magnitude and Direction)
1.	5-4	-1
2.	5-3	-2
3.	5-B	basket
4.	7-10	+3
5.	10-9	-1
6.	10-8	-2
7.	10-9	-1
8.	10-8	-2
9.	7-8	+1
10.	10-9	-1
11.	10-B	basket
12.	2-2	correct response
13.	3-1	-2
14.	2-1	spoil of earlier correct response
15.	3-2	-1
16.	2-2	correct response
17.	1-1	correct response
18.	6-7	+1
19.	4-6	+2
20.	4-5	+1
21.	4-4	correct response
22.	5-6	+1
23.	3-3	correct response
24.	9-9	correct response
25.	10-5	-5
26.	5-5	correct response
27.	6-6	correct response
28.	10-10	correct response
29.	8-8	correct response
30.	7-7	correct response

Summary of Scores:	correct	10
	spoil	1
	baskets	2
	errors	16
	trials	29

APPENDIX B (cont.)

EVALUATION

Observation of Stanford-Binet Intelligence Test

Subject: Mary Ellen

Date: 9.15.70.

Recorder: H.

Examiner: D.K.

Note: Mary Ellen has a speech impediment so many of her responses were difficult to understand.

Picture Vocabulary IV, 1

E states word and turns pages.

For responses 1-11 S gives a single verbal response - Speech was inaudible because of her impediment. (1-11)

12. For foot S points (12)
and says "I don't know" (13)
13. S says a word (14)
14. S says a word (15)
15. S says "arm" (16)
and demonstrates by holding up arm (17)
16. S says a word (18)
17. S says a word (19)
18. S says a word (20)

Naming Objects from Memory IV, 2

E presents materials and makes the request.

- a. S says "dog" (1)
b. S gives verbal response. (2)

Opposite Analogies IV, 3

E states sentence

- a. S says "girl" (1)
b. S says "night time" (2)
c. S says "cow" (3)
d. S says unclear verbal response (4)
e. S says "night time" (5)

Pictorial Identification IV, 4

E instructs

- a. S points and says name (1), (2)
b. S " " " " (3), (4)
c. S " " " " (5), (6)
d. S " " " " (7), (8)
e. S " " " " (9), (10)
f. S " " " " (11), (12)

APPENDIX B (cont.)

Discrimination of Forms IV, 5

E instructs

S points to each of the 10 forms (1-10)

Comprehension IV, 6

E. asks question
E. further questions
E. asks question

1. S responds (1)
S responds (2)
2. S responds (3)

Aesthetic Comparison IV-6, 1

E asks question

- a. S points (1)
- b. S points (2)
- c. S points (3)

Pictorial Similarities and Differences IV-6, 3

E instructs

- a. S points (1)
- b. S points (2)
- c. S points (3)
- d. S points (4)

Materials IV-6, 4

E asks question

- a. S answers "wood, brick". (1)
- b. S says "glass" (2)
- c. S says "I don't know". (3)

Three Commissions IV-6, 5

E instructs

S performs request (1)

Comprehension IV-6, 6

E asks question

- a. S says "close, open" (1)
- b. S says "hear" (2)

Picture Completion V, 1

E instructs

E says "did you finish it?"
"Make all of the rest."

S takes the pencil and finishes
drawing the man. (1)
S takes pencil and continues to
draw. (2)

Paper Folding V, 2

E instructs
E says "good"

S attempts to fold paper, folds
paper. (1)

APPENDIX B (cont.)

Definitions V, 3

E asks word meaning

- a. S says "you bounce it." (1)
- b. S says "you wear it." (2)
- c. S makes verbal response. (3)

Square V, 4

E instructs
gives second trial
gives third trial

- a. S takes pencil and draws (1)
- b. S makes square (2)
- c. S makes square (3)

Pictorial Similarities and Differences V, 5

E instructs

- a. S nods yes (1)
- b. S nods no and verbally explains (2) (3)
- c. S nods no (4) and explains (5)
- d. S nods head (6)
- e. S nods head (7)
- f. S nods head (8)
- g. S nods head (9)
- h. S nods head (10)
- i. S says "yes" (11)
- j. S says "no" (12)
- S says "I'm going to go home Friday."

Patience Triangles V, 6

E instructs
gives 3 trials

- a. S attempts to put pieces together (1)
- b. S attempts to put pieces together (2)
- c. S attempts to put pieces together (3)

Vocabulary VI, 1

E asks word meaning

- 1. S says "you eat it." (1)
- 2. S says "you write (2) mail it." (3)
- 3. S says "when you want to drink you get a straw." (4)
- 4. S gives a verbal response (5)
- 5. S says "I don't know". (6)
- 6. S says "I don't know". (7)
- 7. S says "a lion roars". (8)
- 8. S points to her brow. (9)
- 9. S says "I don't know". (10)
- 10. S says "no" (11)
- 11. S says "I don't know" (12)
- 12. S says "I don't know" (13)

APPENDIX B (cont.)

Differences VI, 2

E asks question

- a. S says "bird sings, dog barks" (1)
- b. S says "boot wear on rainy day, slippers at night" (2)

Mutilated Pictures VI, 3

E instructs

- a. S points (1)
- b. S makes verbal comment (2) and points (3)
- c. S says "I don't know" (4)
- d. S says "one ear" (5)
- e. S says "one finger" (6)

Number Concepts VI, 4

E directs

- a. S places 2 blocks (1)
- b. S places some blocks (2)

E discontinues

Opposite Analogies VI, 5

E states sentence

- a. S makes verbal response (1)
- b. S says "flies" (2)
- c. S makes verbal response (3) says "I don't know" (4)
- d. S says "long" (5)

Maze Tracing VI, 6

E instructs

- a. S takes pencil (1) makes a verbal comment (2) draws
- b. S takes pencil (3) repeats "shortest way to school" (4) and draws.

Second Session

Picture Absurdities VII, 1

E questions

- a. S points to picture (1) and makes a verbal response. (2)

E asks more

S makes a verbal response (3)

E questions

- b. S points (4) - verbally explains (5) - she nods head. (6)

E questions

- c. S points (7) - verbally explains (8) S responds (9)

E questions further

- d. S points (10) and tells what's funny (11) - gives added response (12)

- e. S points (13) and says "cats supposed to mouses" (14)

APPENDIX B (cont.)

Similarities VII, 2

E questions
E questions more

E asks more

- a. S makes verbal response (1)
- b. S says "I don't know" (2) -
says "I don't know" (3)
- c. S makes verbal response (4) says
"I don't know" (5)

Copying a Diamond VII, 3

E instructs

E gives another trial

- a. S nods yes.
Takes pencil and draws (1)
- b. S draws and says (2) "that's
my last one" (3)

Comprehension VII, 4

E asks questions
questions more and repeats

E repeats

- a. S says "I don't know" (1)
- b. S says "Go buy a new one" (2)
S nods yes (3)
- c. S says "Go to the principal" (4)
gives verbal response (5)
- d. S says "wind" (6)
Says "blows it back and forth" (7)
- e. S says "Go to mommy - mommy will
ma'e her leave" (8)
- f. S says "tell them we don't
remember" (9)

Opposite Analogies VII, 5

States sentences

- a. S says "little" (1) and
demonstrates (2).
- b. S says "ice" (3)
- c. S says "wings" (4)
- d. S says "I don't know" (5)

Repeating Digits VII, 6

- a. S repeats numbers (1)
- b. S repeats numbers (2)

Memory for Stories VIII, 2

E instructs

- a. S says "I don't know" (1)
- b. S says "Dick" (2)
- c. S says "a farm" (3)
- d. S says "Daddy (4) go home on
Friday with Daddy" (5)
- e. S says "pony ran away" (6)
- f. S says "went on ground and got
all muddy". (7)

APPENDIX B (cont.)

Verbal Absurdities VIII, 3

States task request

a. S says "both" (1)

b. S says "I don't know" (2)

E discontinues

Similarities and Differences VIII, 4

States request
asks for more

a. S says "see baseball, orange
you eat (1) I don't know (2)
I'm hungry" (3)

b. S says "I don't know" (4)

Naming days of the week VIII, 6

E states request

S gives verbal response but not in
order (1)

Says "Friday is when I go home"(2)

APPENDIX B (cont.)

Classification of Child Responses on the Stanford Binet

Child: Mary Ellen
Scorer: MH

Test Item Year No.	WORK		Spontaneous		Negation		Substitution		NON WORK		Competence	
	Work Delimitation		Extension		V Non V		V Non V		Request for Aid		V Non V	
Picture Vocabulary IV, 1	V	Non V	V	Ncn V	V	Non V	V	Non V	V	Non V	V	Non V
	(1)(2)(3)(4) (5)(6)(7)(8)	(12)									(13)	
	(9)(10)(11)(14) (15)(16)(18) (19)(20)	(17)										
Naming Objects IV, 2	(1)(2)											
Opposite Analogies IV, 3	(1)(2)(3) (4)(5)											
Pictorial Identifi- cation IV, 4	(2)(4)(6) (8)(10)(12)	(1)(3) (5)(7) (9)(11)										
Discrimination of Forms IV, 5		(1)(2) (3)(4)(5) (6)(7)(8) (9)(10)										
Comprehension IV, 6	(1)(2) (3)											
Aesthetic Comparison IV - 6, 1		(1)(2)(3)										
Pict. Sim. & Diff. IV - 6, 3		(1)(2)(3) (4)										
Materials IV - 6, 4	(1)(2)										(3)	
Three Commissions IV - 6, 5		(1)										
Comprehension IV - 6, 6	(1)(2)											
Picture Completion V, 1		(1)(2)										

APPENDIX B (cont.)

Classification of Child Responses on the Stanford Binet (cont.)

Child: Mary Ellen
Scorer: MH

WORK

NON WORK

Test Item	Year	No.	Work Delimitation		Spontaneous Extension		Negation		Substitution		Request for Aid		Competence V	Passive Non V
			V	Non V	V	Non V	V	Non V	V	Non V	V	Non V		
Paper Folding V, 2				(1)										
Definitions V, 3			(1)(2)(3)											
Square V, 4				(1)(2)(3)										
Pict. Sim. & Diff. V, 5			(3)(5) (11)(12)	(1)(2)(4) (6)(7)(8)										
				(9)(10)										
Patience Rectangles V, 6				(1)(2)(3)										
Vocabulary VI, 1			(1)(2)(3) (4)(5)(8)	(9)									(6)(7)(10) (11)(12)(13)	
Differences VI, 2			(1)(2)											
Mutilated Pictures VI, 3			(2)(5) (6)	(1)(3)									(4)	
Number Concepts VI, 4				(1)(2)										
Opposite Analogies VI, 5			(1)(2) (3)(5)										(4)	
Maze Tracing VI, 6			(2)(4)	(1)(3)										
Picture Absurdities VII, 1			(2)(3) (5)(8)(9)	(1)(4)(6) (7)(10)(13)										
			(11)(12) (14)											

APPENDIX B (cont.)

Classification of Child Responses on the Stanford Binet (cont.)

Child: Mary Ellen
Scorer: MH

WORK

NON WORK

Test Item	Year	No.	Work Delimitation		Spontaneous Extension		Negation		Substitution		Request for Aid		Competence		Passive	
			V	Non V	V	Non V	V	Non V	V	Non V	V	Non V	V	Non V	V	Non V
Similarities VII, 2			(1)(4)										(2)(3)(5)			
Copying a Diamond VII, 3				(1)(2)	(3)											
Comprehension VII, 4			(2)(4)(5) (6)(7)(8)	(3)									(1)			
			(9)													
Opposite Analogies VII, 5			(1)(3) (4)	(2)									(5)			
Repeating Digits VII, 6			(1)(2)													
Memory for Stories VIII, 2			(2)(3) (4)(6)(7)		(5)								(1)			
Verbal Absurdities VIII, 3			(1)										(2)			
Sim. & Diff. VIII, 4			(1)						(3)				(2)(4)			
Naming Days of Week VIII, 6			(1)		(2)											
Total	174		91	60	3	0	0	0	1	0	0	0	19	0	0	0

APPENDIX C

DIRECTIONS FOR RECORDING

The observer should be alone in the one way vision room. The six zone microphone should be adjusted for optimum pickup of the child being observed.

I. Equipment Needed: Dictaphone, stop watch, pencil and paper.

II. General Information:

1. Note the following on a cover sheet:

Name of child selected for observation
Activity or type of task
Date
Session
Time
Name of each child in the classroom
Area of activity for each child
Activity of each child

List the teachers who are in the room

Pupil-teacher ratio

List any additional comments to help describe environment.

III. Rules for Recording:

1. Record the child's name, date and session into the dictaphone. Sessions should be numbered 1 to 5 for the first set of behavior samples and 6 to 10 for the follow up set.
2. State in one sentence or two the description of the setting.

Example: Steven is sitting at the round table. He is painting a wood construction.
3. After the descriptive statement is made start timing for a 10 minute sample. The 10 minute period should be a central interval in the half hour class period.
4. Try to report all significant behavior in simple sentences.
5. Record all behavior made by the child being observed. This includes behavior directed at objects, children and adults in the room.

Examples: He said to Miss A. "I'm going home for the weekend on Friday."

He looks at Timothy.

He picks up the yellow brush and starts brushing on the paper.

APPENDIX C (cont.)

6. Record all behavior directed toward the child.

Examples: Miss A. is wiping Steven's hands.

Timothy threw a basket at Steven.

Miss B. notices that Steve is trying to pull himself up. She asks Miss A. to reposition him.

7. When a child persists at the same activity for longer than 10 seconds, it should be reported as a second response.

Example: He is making some strokes with the brush. He continues to brush.

APPENDIX D

DIRECTIONS FOR NUMBERING RESPONSES AND SCORING

LEVEL I. Numbering of Responses

- A. Number of Teacher Interventions (units of behavior)
- B. Number of Child Responses (units of behavior)
- C. Number of responses made by other children which are directed toward the main subject.

General Rules:

The responses are numbered in consecutive order, after the protocol has been edited by the recorder. The child's responses are numbered in black, the teacher's interventions are numbered in color (red for Miss B., blue for Miss A.).

The primary guide for determining a unit of behavior is the appearance of a main verb. The following rules are examples further designating a unit of behavior.

1. A change of behavior is a separate response.

Examples:

Child Responses - She rolls her dough. ⁽¹⁾

She now tastes it. ⁽²⁾

Teacher Interventions - Miss B. feels ⁽¹⁾ it and verbally encourages him to feel ⁽²⁾ it.

2. A behavior that persists 10 seconds or more is scored as a separate response.

Examples:

Child Responses - He starts to brush on the wood. ⁽¹⁾

He continues to brush. ⁽²⁾

3. When a child moves quickly such that the recorder combines several movements, it is scored as one response.

Examples:

Denise puts two more pieces in place. ⁽¹⁾

4. If behavior has two dimensions, it is scored as two responses.

Examples:

Child Responses - Steven slaps on the table with his hands, and ⁽¹⁾ looks at Miss A. at the door. ⁽²⁾

APPENDIX D (cont.)

Teacher Interventions - Miss B. brings an apron to Denise (1)
(2)
and says, "put in on."

5. If the behavior dimension has separate qualities, each quality is scored as a separate response.

Examples:

(1) (2) (3)
He scoops some sand into the cup, he levels the sand and pats
it with his hand.

(1) (2)
He scoops from a distance and brings the sand and pours it into the cup.

6. When a child picks up material, uses it and puts it down, it is scored as one response.

Examples:

Child Responses - He puts the red brush back, he pulls out the
(1)
yellow one and he paints busily.
(1)
She picks up the sponge, wipes the baby and puts
the sponge down.

7. Descriptive sentences of the situation are for clarification and are not numbered. They are usually put in brackets.

Examples: [Steven is clean now.]
[He seems to be making a design.]

8. When a child "passively sits," "listens" or "waits," it is scored as a response.

Examples:

(1)
Child Responses - He is passively sitting.
(1)
She says, "I put on my apron," and she waits
(2)
patiently.

9. "Looking" and "Smiling" are scored as separate responses.

Examples:

(1) (2)
Child Responses - Denise looks over at Buster and smiles at him.
(1) (2)
Teacher Interventions - Miss A. looks at Steven and smiles.

APPENDIX D (cont.)

10. Responses directed toward the subject from another child or teacher are numbered as responses for other child or the teacher.

Examples:

(1) other child
Child Responses - Buster hands Denise a tray and he says
(2) other child
"Like this one?"

(1)
Teacher Interventions - Miss B. repeated, "You want a cake pan?"

11. When a teacher leaves to put materials away or get materials, this alone is not a response.

Examples:

Teacher Interventions - Miss B. goes to the kitchen and brings
(1)
Denise some seasoning.

12. When a teacher walks toward the child, it alone is not a response.

Examples:

Teacher Interventions - Miss A. comes over to Steven and she finishes
(1)
washing his hands, getting the spots that he
missed himself.

13. When a teacher talks to another teacher about the child being observed it is a teacher-teacher interaction. It is scored as an intervention for each teacher.

LEVEL II. Child Responses

- A. Evokes
- B. Responds
- C. Evoke-Respond
- D. Independent

The child's responses are categorized as:

- A. E = Evokes

1. The child tries clearly to evoke or initiate an action.

Examples: Denise says "All done. All done." (E_T)

Miss B. went to get an apron. Denise says, "I want
a cup." (E_T)

APPENDIX D (cont.)

2. The clear intent to evoke a teacher or a child is an E category even though no one answers.

Examples: He looks at Miss B. and smiles. (E_T)

Denise is asking for a bowl. (E_T) Both teachers are very busy.

3. If an E response is directed toward a teacher it is marked E_T.
4. If an E response is directed toward another child it is marked E_C.

B. R = Responds.

1. Responds is a reaction to a direct request or initiative act from a teacher or another child, usually the first response or pair of responses following an initiative act of the teacher.

Example: Miss B. says, "I'm going to get you a bowl."

Denise has her eyes fixed on Miss B. as she goes to get the bowl. (R_T)

2. If an R response is a reaction to a teacher it is marked R_T.
3. If an R response is a reaction to another child it is marked R_C.

C. E-R = Evoke-Respond (combined).

1. A non-specifiable interaction when there is question as to whether it is an Evoke or Respond.
2. If it is an interaction with a teacher, it is marked E-R_T.
3. If it is an interaction with another child, it is marked E-R_C.

D. I = Independent

1. Independent responses are when the child works alone without intent to evoke or respond. If a teacher is there but not doing anything the response is Independent.

Example: Denise continues to scoop salt into her pan and she stirs it. Now she pours all of the salt from that one cup back into the pan. (I) Miss A. is standing nearby.

APPENDIX D (cont.)

2. Independent responses can be in relation to other children and adults as well as materials. For example: Teacher and Children IT&C - Denise is looking at Miss B. working with the twins on the floor.

I responses can be categorized as:

I_T (teacher related); I_C (child related); $I_{T\&C}$ (teacher and child related).

LEVEL III. Child Response Style

The Hertzog et al. (1968) method of classifying a child's behaviors was modified for classroom performance. Three categories were added: Request for Materials, Request for Recognition and Social.

The modified classification form is presented below:

	<u>Response Style</u>	<u>V</u>	<u>NV</u>
Work:	Work Delimitation	___	___
	Spontaneous Extension	___	___
	Request for Materials	___	___
	Request for Recognition	___	___
Non Work:	Negation	___	___
	Substitution	___	___
	Request for Aid	___	___
	Competence	___	___
	Passive	___	___
Social:	Social (not task relevant)	___	___
	Totals	___	___

LEVEL IV. Teacher Interventions

1. Teacher interventions are numbered in consecutive order and in different color for each teacher (Level I).
2. Teacher interventions are then placed in the following categories:

A. Preparation of Child and Materials - Verbal
Non Verbal

APPENDIX D (cont.)

Examples: Verbal - She says, "I'll get you an apron."

Non Verbal - Miss B. brings an apron to Denise.

B. Instructional - Verbal
Non Verbal

Examples: Verbal - Miss A. says, "Put the sand in the pan."

Non Verbal - Miss A. shows Denise how she can
hold it over the pan.

C. Controlling - Verbal
Non Verbal

Examples: Verbal - Steven picks up the tape, starts to
handle it. Miss A. comes by and says,
"O.K., now stop."

Non Verbal - Miss A. takes the tape away from him.

Denise pushes herself away and starts
to move her wheelchair. Miss A. re-
strains her and wheels her back.

D. Social - Verbal
Non Verbal

Examples: Verbal - He says to Miss A., "I'm going home for
the weekend on Friday." Miss A. says,
"Oh, on Friday."

Non Verbal - Miss B. comes over, warmly holds
his hand.

E. Miscellaneous - Verbal
Non Verbal

Examples: Verbal - Teacher-Teacher Interaction about the child
being observed.

Miss A. says to Miss B., "Steven needs help
holding the saw."

Non Verbal - Miss B. comes over, observes his work.

APPENDIX D (cont.)

LEVEL V. Of the categories in Level IV, the Instructional Interventions are further classified into the following subcategories.

Verbal

Information Giving - when the teacher states any facts, concepts or ideas.

Eliciting a Response - when the teacher attempts to engage the child in activities through questions or instructions to respond.

Directing or Redirecting - when the teacher's intent is to refocus attention. This is done verbally. Example: calling child's name.

Reinforcing - when the teacher gives positive or negative verbal reinforcement such as confirmations, negations and corrective negations.

Role Playing - when the teacher participates verbally along with the child in an activity. Example: dramatic play.

Non Verbal

Showing - when the teacher demonstrates.

Assisting - when the teacher assists the child in performing the task.

Presenting - When the teacher presents materials in order to elicit a response.

Positioning - when the teacher's intent is to refocus attention. This is done non-verbally and often involves positioning child or materials.

Reinforcing - when the teacher gives positive or negative non-verbal reinforcement such as nodding of yes or no.

Role Playing - when the teacher participates non-verbally along with the child in parallel play. Example: building tracks for a train.

APPENDIX E

SUMMARY OF CLASSROOM OBSERVATION

Name: Mary Ellen
 Scorer: DK
 Session: 4
 Date: 10/23/70

Task Type: I, 1 (piece of equip.)
 Pupil-Teacher Ratio: 4:2
 No. of sessions child
 is in pre-school: 1

Level I Number of Teacher Interventions: TA = 34

Number of Child Responses: 58

Level II Child Responses

a. Independent: 33
 b. Evokes: 8
 c. Responds: 15
 d. Evoke-Respond: 2

Level III Child Response Style

	V	NV	V	Summary NV	Total
Work: (Work Delimitation	<u>4</u>	<u>34</u>	5	34	39
(Spontaneous Extension	<u>0</u>	<u>0</u>			
(Request for Recognition	<u>1</u>	<u>0</u>			
(Request for Materials	<u>0</u>	<u>0</u>			
Non Work: (Negation	<u>0</u>	<u>1</u>	0	1	1
(Substitution	<u>0</u>	<u>0</u>			
(Request for Aid	<u>0</u>	<u>0</u>			
(Competence	<u>0</u>	<u>0</u>			
(Passive	<u>0</u>	<u>0</u>			
Social: (Social	<u>5</u>	<u>13</u>	5	13	18
Total	10	48			58

APPENDIX E (cont.)

Name: Mary Ellen
 Scorer: DK
 Session: 4
 Date: 10/23/70

Task Type: I, 1 (Piece of Equip.)
 Pupil-Teacher Ratio: 4:2
 No. of sessions child
 is in pre-school: 1

Level IV	Teacher Response	TA	TB	T-
	A. Prep. C & M: Verbal	<u>0</u>	—	—
	Non Verbal	<u>6</u>	—	—
	B. Inst.: Verbal	<u>12</u>	—	—
	Non Verbal	<u>8</u>	—	—
	C. Control: Verbal	<u>0</u>	—	—
	Non Verbal	<u>0</u>	—	—
	D. Social: Verbal	<u>4</u>	—	—
	Non Verbal	<u>0</u>	—	—
	E. Misc.: Verbal	<u>0</u>	—	—
	Non Verbal	<u>4</u>	—	—

Level V	Instructional Category	
	Verbal	Non Verbal
	1) information giving <u>4</u>	2) show-assist <u>5</u>
	3) eliciting a response <u>3</u>	4) presenting <u>1</u>
	5) directs or redirects <u>0</u>	6) directs or redirects <u>0</u>
	7) reinforcing <u>4</u>	7) reinforcing <u>0</u>
	9) role playing <u>1</u>	8) role playing <u>2</u>

APPENDIX E (cont.)

Mary Ellen

Session 4

10/23/70

9:10

Child	Activity	
Mary Ellen	Round Table	peg board and blocks
Edna Claudio	Painting Easel	painting
Lillian Marcia	Round Table	form sort task
Jill Heffron	Sand Table	

Teachers:

TA

TB

Task - I Peg board and blocks on a city-plan
peg board

Ratio 4:2

Note: Mary Ellen looks at others as she works. This looking behavior
is social.

APPENDIX E (cont.)

Mary Ellen

Session 4

10/23/70

Mary Ellen is working at the round table with a puzzle. She is
(1) (2)
putting a piece in and she pulls out another piece and holds it up.
(3) (4)
She continues to work on this. Now she looks up at Miss A. Miss A is
1 (5)
talking to her but I wasn't able to make it out. Mary Ellen continues
to manipulate the materials in front of her. Miss A now has taken one of
2
the pegs and blocks and is showing her how to build. It's like a peg and
and wood building structure where you can build a little village on this peg
(6)
board. Mary Ellen continues to manipulate the material. Miss A has
3
brought more pegs and is placing these pegs into the peg board. Mary Ellen
(7)
continues to take pieces from the basket and place them in the peg board.
4 5
Miss A has brought a basket and she is dividing the pieces. Mary Ellen
6
says something about her building and Miss A says "Oh wow, that's a tall
7
one." Miss A has put the pieces in a platter tray so that Mary Ellen can
(9) (10)
see better to choose them. Mary Ellen continues to work. Then she looks
at Edna who has started singing "I want pink" meaning paint. Mary Ellen
(11)
resumes her work, making some trees out of the pegs and blocks
(12)
pieces. She continues to construct trees with the peg and block pieces.
(13) (14)
She takes another piece and places it on the board. She continues to
(15)
place pieces on the board. She has paused a moment and is glancing
over at Miss B and Miss A who are talking in the corner. Now she resumes
(16) (17)
her work, continuing to place pieces on the board. She glances at Miss
8 (18)
B. Miss A is observing her from behind. Mary Ellen continues to work on
(21) (22)
the structure. Now she has placed something into the peg hole. She is looking
(23) 9
at her form board and now glances at Miss A who comes by, and is observing

APPENDIX E (cont.)

10
her work. Miss A says something about the work in front of her and asks
11
what did she do with a certain kind of piece. Miss A hands her a piece.
(24)
Mary Ellen continues to manipulate the piece she has in her hand. She
(25)
glances now at Miss A and Lillian who are interacting right beside her
(26) (27)
and she continues to work on her peg board. She continues to work as
12 (28)
Miss A is observing her. Mary Ellen says something to Miss A but it
(29)
was unclear. She continues to build on her peg structure and she simultaneously
(30) (21)
glances at Miss A and Lillian. She continues to look at Miss A and now
(32)
she says "Do you know what?" She says "I'm going to get a hearing aid"
(33) 13
and she points to her ear Miss A comes and says "Oh, you're going to get
14 (34)
a hearing aid" and she's saying "For which ear?" Mary Ellen points to her
(35) 15
ear and tells her and then Miss A describes the hearing aid with the cord
16
and the little box. She demonstrates and Mary Ellen explains. There is
a verbal interaction between the two, discussing the hearing aid. They
(36) 17
continue this conversation it's hard to understand Mary Ellen. Miss A is
18 (37)
saying "Would you wear it all day?" Mary Ellen is answering but I can't
(38)
understand her and neither can Miss A understand. Now Mary Ellen has held
(39)
up a block showing it to Miss A and she places it on the peg board. She
(40) 19
says something to Miss A about "Do you like my building?" and Miss A says
20 21
"Wow". Then Miss A builds one and places it on the board. Miss A says
something about "Do you know what it looks like? I'll show you what it
22 (41)
looks like". She makes one for her. Mary Ellen is saying something to
(42)
Miss A who has gone to get a book. Mary Ellen says "That's what I want to
23
make". Miss A comes with the book and is showing her some pictures of
(43)
buildings in it so that Mary Ellen will make them. Mary Ellen looks at
(44)
the book and then she takes a piece and continues to work on her building

APPENDIX E (cont.)

(45) 24
structure. She says something about Lillian who's moved. Miss A explains
(46)
to Mary Ellen that Lillian is helping herself. Mary Ellen continues to
25
work on her structure. Miss A says something about lights on the city
26
buildings and she makes a street light with a peg board and a round ball
(47)
for Mary Ellen. Mary Ellen continues to build on this city structure.
(48) (49)
She continues placing pegs and blocks on the board. She looks over at
(50)
Miss A who is cleaning up at the end of the table and Mary Ellen continues
(51) 27
to make a building. She made a lamp and Miss A said "Good". Miss A comes
28 29
and says "Shall I put it on" and she makes the motion for switching the
(52)
street light on. Mary Ellen continues to build her structure. She continues
(58) 30
to take pieces and build on this peg structure. Miss A is observing her
31
from behind and now takes some materials from the larger basket and places
(54)
them in the flatter one. Mary Ellen pushes it away. I assume she is finished.
32 (55)
Miss A says "Oh wow, oh wow" and Mary Ellen pushes herself away and walks
33
away from the table. Miss A takes away the boards which hold her walking
34
frame in place so Mary Ellen is free to walk now. Miss A says something
(56) (57)
about giving her a cracker and Mary Ellen continues to walk. Now she is looking
over to the door to where Miss A has gone and she is watching the inter-
(58)
action that's taking place outside the door. She continues to watch.

APPENDIX E (cont.)

Classification of Child and Teacher Responses of Classroom Observation

Child: Mary Ellen
 Session: 4 Level II and IV
 Scorer: DK

1. I	23. I _C 9. NV Misc Obs
2. I	10. V Inst. (er)
3. I	24. R _T 11. NV Inst. (presents)
1. Inst (inf.)	25. I _T & C
4. R _T	26. I
5. R _T 2. NV Inst (shows)	27. I 12. NV Misc Obs
6. R _T 3. NV Prep	28. R _T
4. NV Prep	29. I
7. R _T 5. NV Prep	30. I _T & C
6. V Inst (c)	31. I _T
8. E _T 7. NV Prep	32. E _T
9. R _T	13. V Soc
10. I _C	33. E _T 14. V Soc
11. I	15. V Inst (inf)
12. I	34. R _T 16. NV Inst (show)
13. I	35. R _T 17. V Inst (inf)
14. I	36. E-R _T 18. V Inst (inf)
15. I _{T&C}	37. R _T
16. I	38. E _T
17. I _T 8. NV Misc-Obs	39. I
18. I	40. E _T 19. V Inst (c)
19. I _C	20. NV Inst (role play)
20. I	41. E-R _T 21. V Inst (er)
21. I	22. NV Inst (show)
22. I	42. E _T 23. NV Inst (show)
	43. R _T
	44. R _T

APPENDIX E (Continued)

Classification of Child and Teacher Responses of Classroom Observation

Child: Mary Ellen
 Session: 4 Level II and IV
 Scorer: DK

45.	ET	24.	V Soc
		25.	V Inst (er)
46.	RT	26.	NV Inst (show)
47.	RT		
48.	I		
49.	IT		
50.	I		
51.	I	27.	V Inst (c)
		28.	V Inst (role play)
52.	I	29.	NV Inst (role play)
		30.	NV Misc Obs
53.	I	31.	NV Prep
54.	RT	32.	V Inst (c)
55.	RT	33.	NV Prep
56.	I	34.	V Soc
57.	IT		
58.	IT		

APPENDIX E (cont.)

Classification of Child Responses for Classroom Observation

Child: Mary Ellen
Session: 4 Level III
Scorer: DK

Req. Mat.		Req. Recog.		Work Delimitation		Spontaneous Extension		Negation		Substitution		Request for Aid		Compe- tence		Passive		Social	
V	N-V	V	N-V	V	Non-V	V	Non-V	V	Non-V	V	Non-V	V	Non-V	V	Non-V	V	Non-V	V	Non-V
					(1)(2) (3)(4) (5)(6)														
				(8)	(7)(9) (11)(12) (13)(14) (16)(18) (20)(21)													(10) (15) (17) (19)	
				(28)	(22)(24) (26)(27)													(23) (25)	
		(40)		(41) (42)	(29)(38) (39)(43) (44)(46)										(32)		(30) (31)		
					(47)(48) (50)(51)												(35) (36)	(33) (34)	
					(52)(53) (55)(56)				(54)								(37) (45)	(49)	
																		(57) (58)	
Total	1	0	0	4	34	0	0	0	1	0	0	0	0	0	0	5	13		

APPENDIX F

Table F1

Means and Standard Deviations of Childrens'
Response Style on the Stanford-Binet

	<u>Mean</u>	<u>S.D.</u>
Chronological Age	54.5	15.4
Mental Age	41.1	15.4
I.Q.	75.2	22.8
Temperament Rating	13.8	3.1
<u>Response Style, Percents</u>		
Verbal	46.5	19.9
Work	68.7	15.8
Verbal Work	46.1	19.4
Spontaneous Extension	1.3	3.1
Non Work	30.2	13.3
Negation	19.8	18.1
Substitution	37.5	23.8
Request Aid	7.4	10.0
Competence	20.9	28.7
Passive	14.5	17.1
Formbox		
Number of Trials	26.5	8.3
Cylinders		
Number of Trials	27.5	9.9

APPENDIX F (cont.)

Table F3

Correlation Coefficient Matrix of Child Characteristics in the Individual Session

	Preselects	Looks While Doing	Distractibility	Eye-Hand Coordination	Number of Tasks	Highest Level Task	Lowest Level Task	Extension Level
Preselects	-	.49**	.37**	.74**	X	-.37**	X	.43**
Looks While Doing		-	.33*	.46**	-.28*	X	X	X
Distractibility			-	.38**	X	X	X	.40**
Eye-Hand Coordination				-	X	X	X	.32*
Number of Tasks					-	48**	X	X
Highest Level Task						-	X	-.35**
Lowest Level Task							-	X
Extension Level								-

Note--Only those correlation coefficients which are significant are reported.

*p .05

**p .01

APPENDIX F (cont.)

Table F4
Means and Standard Deviations of
Percent Children's Responses in the Classroom

	<u>Five Classroom Sessions</u>	
	<u>Mean</u>	<u>S.D.</u>
No. of Responses	378.6	54.5
Work	79.4	8.9
Non Work	7.2	5.9
Social	13.4	7.1
Verbal	16.3	10.1
Non-Verbal	83.6	10.1
<u>Work subcategories</u>		
Verbal Work	15.5	9.8
Independent Work	49.8	13.7
Work/Teacher	50.2	13.7
Spontaneous Extension	0.7	1.7
<u>Non Work Subcategories</u>		
Negation	26.5	23.1
Substitution	33.6	23.5
Request Aid	30.5	25.9
Competence	0.8	2.9
Passive	8.6	14.0
Social Looking	72.6	16.8
Peer Interaction	1.3	1.6
Evoke	11.3	4.5

APPENDIX F (cont.)

Table F5
Correlation Coefficient Matrix of Child Responses
in the Classroom - Percents

	Non Work	Non Social	Non Verbal	Non Verbal Work	Verbal Ind. Work	Work Teacher	Spon. Ext.	Neg.	Sub.	Aid	Comp	Pass	Soc.	Peer				
	Work	Social	Verbal	Non-Verbal	Work Subcategories	Verbal Work	Independent Work	Work/Teacher	Spontaneous Extension	Non-Work Subcategories	Negation	Substitution	Request Aid	Competence	Passive	Social Looking	Peer Interaction	Evoke
-	-.61**	-.75**	.31*	.33*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	-.33*	.33*	X	X	X	X	X	X	X	X	X	X	X	X	X
-	-.34*	.34*	-.33*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	-	-1.00**	.98**	X	X	.46**	.43**	X	X	.37**	-.26**	-.38**	.42**	.63**	.63**	.63**	.63**	.63**
-	-.98**	X	X	X	X	-.46**	-.42**	X	X	-.37**	.26*	.37**	.42**	-.63**	-.63**	-.63**	-.63**	-.63**
-	X	X	X	X	X	.46**	.36**	X	X	.32*	X	-.32*	.36**	.59**	.59**	.59**	.59**	.59**
-	-1.00	X	X	-.30*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	-	X	X	.30*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	-.28**	-.28*	X	.48**	X	.48**	X	.48**	X	.48**	X	.48**	X	.48**	X	.48**	X	.48**
-	-.26*	-.47**	X	.35**	X	.35**	X	.35**	X	.35**	X	.35**	X	.35**	X	.35**	X	.35**
-	-.59**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Note: Only those correlation coefficients which are significant are reported.

*p < .05

**p < .01

APPENDIX F (cont.)

Table F6

Correlation Coefficients of Child Characteristics in the
Evaluation with Child Characteristics in the Individual Session

	Preselects	Looks While Doing	Distractibility	Eye-Hand Coordination	Number of Tasks	Highest Level Task	Lowest Level Task	Ext. Level
Mental Age	-.59**	-.48**	-.47**	-.39**	.28*	.56**	X	-.52**
Chronological Age	X	X	X	X	X	.27*	X	-.28*
I Q	-.60**	-.48**	-.41**	-.66**	X	.36**	X	-.34*
Temperament	X	X	.37**	X	X	X	X	X
Stanford-Binet, Percents	-.56**	-.49**	-.36**	-.43**	X	X	X	-.39**
Verbal	-.32*	-.44**	X	X	X	X	X	X
Work	-.59**	-.52**	-.36**	-.50**	X	X	X	-.33*
Verbal Work	.48**	.58**	.41**	.34*	X	-.33*	X	.36**
Non Work	.42**	.38**	.27*	X	X	X	X	.28*
Substitution	-.42**	-.30*	-.33*	X	X	.32*	X	-.38**
Competence	.63**	.42**	.28*	.40**	-.39**	-.57**	X	.46**
Formbox, No. Trials	.58**	.41**	.28*	.40**	-.41**	-.55**	X	.45**
Formbox, Group Class	.45**	X	.35**	X	-.30*	-.51**	X	.38**
Cylinders, No. Trials	.53**	.46**	.45**	.43**	-.33*	-.51**	X	.48**
Cylinders, Group Class								

Note: Only those correlation coefficients which are significant are reported.

* p < .05

** p < .01

APPENDIX F (cont.).

Table F7

Correlation Coefficients of Child Characteristics on the
Evaluation with Percent Children's Responses in the Classroom

	Work	Non-Work	Social	Verbal	Non-Verbal	Verbal Work	Ind. Work	Work/Teacher	Spon. Ext.	Negation	Sub	Req. Aid	Comp	Passive	Social Look	Peer Inter.	Evoke
Chronological Age	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mental Age	X	-.29*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
I Q	X	-.31*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Temperament	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Binet Response	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Style, Percent	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Verbal	.28*	-.32*	X	.67*	-.67**	.69**	X	X	.36**	X	X	X	X	X	-.33*	X	.35**
Work	X	-.28*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Verbal Work	X	-.31*	X	.62**	-.62**	.64**	X	X	.39**	X	X	X	X	X	-.34*	X	.35**
Non Work	X	.43**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Substitution	X	.40**	X	X	X	X	X	X	X	X	X	-.33*	X	X	X	X	X
Competence	X	-.31*	X	.29*	-.29*	X	X	X	X	X	.35**	-.30*	X	X	X	X	X
Formbox Number:	X	X	X	X	X	X	X	X	X	X	X	.27*	X	X	X	X	X
Trials	-.37**	.58**	X	X	X	X	-.34*	.34*	-.28*	X	X	X	X	X	X	-.29*	X
Correct	.39**	.54**	X	.28*	-.28*	.28*	.29*	-.29*	X	X	X	X	X	X	X	.27*	X
Group Class	-.27*	.47**	X	X	X	X	-.37**	.37**	-.31*	X	X	X	X	X	X	-.33*	X
Cylinders	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Number:	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trials	-.36**	.41**	X	-.32*	.32*	-.38**	X	X	-.34*	X	X	X	X	X	X	X	X
Group Class	-.39**	.46**	X	-.29*	.29*	-.33*	X	X	-.36**	X	X	X	X	X	X	X	X

Note: Only those correlation coefficients which are significant are reported.

* $p < .05$

** $p < .01$

APPENDIX F (cont.)
Table F8

Correlation Coefficients of Percent Children's Responses in the
Classroom with Child Characteristics in the Individual Session

	Preselects	Looks While Doing	Distractibility	Eye Hand Coord. Tasks	No. of Tasks	Highest Level Task	Lowest Level Task	Extension Level
Verbal Child Responses	-.33*	X	-.29*	-.41**	X	X	X	-.36**
Non-Verbal Child Responses	.33*	X	.29*	.41**	X	X	X	.36**
Work	-.39**	-.28*	-.29*	-.32*	X	X	X	X
Verbal Work	-.34*	X	-.27*	-.40**	X	X	X	-.38**
Independent Work	-.32*	X	X	X	X	X	X	X
Spontaneous Extension	-.32*	X	X	-.34*	X	X	X	X
Non-Work	.50**	.31*	.34*	X	X	-.33*	X	X
Independent Non-Work	X	X	.41**	X	X	X	X	X
Substitution	.27*	X	.49**	X	X	X	X	X
Request for Aid	X	X	-.32*	X	X	X	X	X

Note - Only those correlation coefficients which are significant are reported.

*p .05

**p .01

APPENDIX F (cont.)

Table F9

Means and Standard Deviations of
Percent Teaching Style in the Classroom

	<u>Five Classroom Sessions</u>	
	Mean	SD
No. of Interventions	268.3	77.2
<u>Major Categories</u>		
Preparational	24.5	7.3
Instructional	61.0	8.7
Controlling	1.6	1.8
Social	2.6	1.8
Miscellaneous	10.3	5.3
Verbal	44.5	8.7
Non-Verbal	55.5	8.7
<u>Instructional Interventions</u>	61.0	8.7
Verbal	56.9	11.4
Non-Verbal	43.1	11.4
<u>Instructional Subcategories</u>		
Information Giving	19.2	8.1
Role Playing	3.1	5.6
Reinforcing	12.8	7.7
Redirecting	5.7	4.4
Eliciting a Response	10.4	3.8
Presenting	22.0	7.1
Showing	19.5	6.5
Assisting	7.4	5.9

APPENDIX F (cont.)

Table F10 Correlation Coefficient Matrix of Percent Teaching Style

	No.		Non		Verb.		Prep.		Inst.		Cont.		Social Misc.		Verb. Non V		Inf.		Role		Reinf.		Redir.		Res.		Show.		Aest.		Ratio		Type	
	Inter.	Verb.	Verb.	Non	Verb.	Non V	Verb.	Non V	Inst.	Inst.	Cont.	Social Misc.	Verb.	Non V	Inf.	Role	Reinf.	Redir.	Res.	Show.	Aest.	Ratio	Type	Type										
No. Interventions	.27*	-	.27*	-	.27*	-	.69**	-	.70**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Verbal	-	-	-	-	-	-	1.00**	X	.26*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Non-verbal																																		
Preparational																																		
Instructional																																		
Controlling																																		
Social																																		
Miscellaneous																																		
Instructional:																																		
Verbal Inst.																																		
Non-verbal Inst.																																		
Information Giving																																		
Role Playing																																		
Reinforcing																																		
Redirecting																																		
Elicit A Response																																		
Presenting																																		
Showing																																		
Assisting																																		
Ratio																																		
Type I Task																																		
Type II Task																																		

Note: Only those correlations which are significant are reported.

*p < .05

**p < .01

APPENDIX F (cont.)

Table F11

Correlation Coefficients of Child Characteristics on the
Evaluation with Major Categories of Teaching Style

	Number Inter- ventions	P e r c e n t				
		Verbal	Non-Verbal	Preparat- ional	Instructional	Controlling Social Miscellaneous
Chronological Age	X	X	X	X	X	X
Mental Age	.43**	.26*	-.26*	X	X	.33*
I Q	.28*	X	X	X	X	X
Temperament Rating	X	X	X	X	.27*	X
Response Style, Percent Verbal	X	.62**	-.62**	X	X	X
Work	X	X	X	X	X	X
Verbal Work	X	.57**	-.57**	X	X	X
Spontaneous Extension	X	X	X	X	X	X
Non Work	X	X	X	X	.28*	-.36**
Substitution	.40**	X	X	X	X	X
Competence	.33*	.40**	-.40**	X	X	X
Form Box						
No. of Trials	.31*	-.26*	.26*	X	.37**	-.36**
No. of Form Errors	X	-.27*	.27*	X	.30*	-.39**
Group Class	.33*	X	X	X	.43**	-.53**
Cylinders						
No. of Trials	X	-.32*	.32*	X	X	-.40**
Group Class	X	-.30*	.30*	X	X	-.49**

Note: Only those correlation coefficients which are significant are reported.

*p < .05

**p < .01

APPENDIX F (cont.)
Table F12

Correlation Coefficients of Child Characteristics on the
Evaluation with Percent Instructional Subcategories

	Verbal Instruction	Non-Verbal Instruction	Inf. Giving	Role Playing	Reinforcing	Redirecting	Elicit A Response	Presenting	Showing	Assisting
Chronological Age	X	X	X	X	X	X	X	X	X	X
Mental Age	.36**	-.36**	.29*	X	X	X	X	-.28*	-.28*	X
I Q	.29*	-.29*	.27*	X	X	X	X	X	X	X
Temperament	X	X	X	X	X	X	X	X	X	X
Response Style, Percent										
Verbal	.67**	-.67**	.47**	X	X	X	X	-.29*	-.56**	-.46**
Work	X	X	X	X	X	X	X	X	X	X
Verbal Work	.63**	-.63**	.42**	X	X	X	X	X	-.51**	-.50**
Non Work	X	X	X	X	-.30*	X	X	X	X	X
Substitution	-.32*	.33*	-.36**	X	-.30*	.28*	X	.50**	X	X
Competence	.42**	-.42**	.40**	X	X	X	X	-.34*	.32*	X
Passive	X	X	X	X	X	X	X	X	.35**	X
Formbox										
No. of Trials	-.45**	.45**	-.51**	X	X	X	X	.32*	X	.45**
No. Correct	.45**	-.45**	.54**	X	.31*	X	X	-.33*	X	-.45**
Group Class	-.42**	.42**	-.48**	X	X	X	X	.36**	X	.36**
Cylinders										
No. of Trials	-.39**	.39**	-.44**	X	X	X	X	X	.35**	X
Group Class	-.40**	.40**	-.40**	X	X	X	X	X	X	.43**

Note: Only those correlation coefficients which are significant are reported.

*p < .05

**p < .01

APPENDIX F (cont.)

Table F13

Correlation Coefficients of Percent Teaching Style in the Classroom with Child Characteristics in the Individual Session

	Looks While		Eye-Hand		Number of Tasks	Highest Level Task		Lowest Level Task		Extension Level
	Preselects	Doing	Distractibility	Coordination		Task	Task	Task	Task	
No. Teacher Interventions	X	X	X	X	X	X	X	X	X	X
Verbal Interventions	X	X	X	X	X	X	X	X	X	X
Instructional	.31*	X	X	X	-.33*	-.30*	X	X	X	-.29*
Verbal Instructional	-.34*	X	-.29*	-.29*	X	X	X	X	X	X
Preparational	X	X	X	X	X	X	X	X	X	-.30*
Controlling	X	X	X	X	X	X	X	X	X	X
Miscellaneous	-.39**	-.30*	X	X	.43**	.52**	X	X	X	X
Social	X	X	X	X	.33*	.34*	X	X	X	X
Information Giving	-.43**	X	-.41**	-.43**	X	.46**	X	X	X	-.40**
Showing	X	X	X	X	X	X	X	X	X	.31*
Assisting	.39**	.51**	X	.45**	-.29*	X	X	X	X	X
Presenting	X	X	X	X	X	-.33*	X	X	X	X
Redirecting	X	X	.28*	X	X	X	X	X	X	X
Reinforcing	-.35**	-.40**	X	X	.33*	X	X	X	X	X

Note: Only those correlation coefficients which are significant are reported.

*p .05

**p .01

APPENDIX F (cont.)
Table F14

Correlation Coefficients of Percent Children's Response Style
in the Classroom and Major Categories of Teaching Style

	No. Intervent.	Verbal	Non Verbal	Preparat.	Inst.	Control.	Social	Misc.
No. of Responses	X	X	X	X	X	X	X	.34*
Work	X	X	X	X	X	-.34*	X	.30*
Non Work	X	X	X	X	X	.67**	X	-.50**
Social	-.32*	X	X	X	X	X	.35**	X
Verbal	X	.72**	-.72**	X	X	X	X	X
Non Verbal	X	-.72**	.72**	X	X	X	X	X
<u>Work Subcategories</u>								
Verbal Work	X	.72**	-.72**	X	X	X	X	X
Independent								
Work	-.81**	-.36**	.36**	.56**	-.75**	X	X	.45**
Work/teacher	.81**	.36**	-.36**	-.56**	.75**	X	X	-.45**
Spontaneous								
Extension	X	X	X	X	X	X	X	X
<u>Non-Work Subcategories</u>								
Negation	X	X	X	.30*	X	X	X	X
Substitution	.40**	X	X	X	X	.35**	X	X
Request Aid	X	X	X	X	X	-.49**	X	X
Competence	X	X	X	X	X	X	X	X
Passive	X	-.29*	.29*	X	X	X	X	X
<u>Social</u>								
Looking	X	-.37**	.37**	X	X	X	-.39**	X
Peer								
Interaction	-.31*	X	X	X	X	X	.32*	X
Evoke	X	.39**	-.39**	X	X	X	X	X

Note: Only those correlation coefficients which are significant are reported.

*p < .05

**p < .01

APPENDIX F (cont.)
Table F15
Correlation Coefficients of Percent Children's Response Style
in the Classroom and Percent Instructional Subcategories

No. of Responses	Verbal Instr.		Non Verbal Instr.		Infor. Giving		Role Playing		Redirect.		A Response		Presenting Showing		Assisting	
	Instr.		Instr.		Giving		Playing		Reinf.		Eliciting		Showing		Assisting	
Work	.36**	X	.36**	X	.44**	X	.27*	X	.35**	X	.35**	X	.45**	X	.32*	X
Non Work	-.27*	X	-.27*	X	-.35**	X	-.31*	X	.39**	X	.35**	X	.33*	X	-.33*	X
Social	X	X	X	X	-.27*	X	X	X	X	X	X	X	X	X	X	X
Verbal	.65**	X	.65**	X	.54**	X	X	X	X	X	.35**	X	.44**	X	.33*	X
Non Verbal	-.65**	X	-.65**	X	-.54**	X	X	X	X	X	-.35**	X	.44**	X	.32*	X
<u>Work Subcategories</u>																
Verbal Work	.64**	X	.64**	X	.52**	X	X	X	X	X	.33*	X	.46**	X	.31*	X
Independent Work	X	X	X	X	X	X	X	X	.30*	X	-.43**	X	.33*	X	X	X
Work/Teacher	X	X	X	X	X	X	X	X	-.30*	X	.43**	X	.33*	X	X	X
Spontaneous Ext.	.29*	X	.29*	X	.33*	X	X	X	X	X	X	X	X	X	X	X
<u>Non Work</u>																
<u>Subcategories</u>																
Negation	.35**	X	.35**	X	X	X	X	X	X	X	X	X	.45**	X	X	X
Substitution	X	X	X	X	X	X	X	X	.33*	X	X	X	X	X	X	X
Request Aid	X	X	X	X	X	X	X	X	-.34*	X	X	X	X	X	X	X
Competence	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Passive	-.30*	X	.30*	X	X	X	X	X	X	X	-.30*	X	X	X	.46**	X
Social Looking	-.32*	X	.32*	X	-.30*	X	X	X	X	X	X	X	X	X	X	X
Peer Interaction	.33*	X	-.33*	X	.38**	X	X	X	X	X	X	X	-.40**	X	X	X
Evoke	.38**	X	-.38**	X	X	X	X	X	X	X	X	X	-.40**	X	-.27*	X

Note: Only those correlation coefficients which are significant are reported.

*p < .05
**p < .01